

**MISSOURI STATE EMPLOYEES' RETIREMENT SYSTEM**  
**ANNUAL ACTUARIAL VALUATION**  
**JUNE 30, 2014**

**Contribution Rate Minimum**

Until the actuarial funding ratio of the MOSERS Plan is at least 80%, the annual actuarial required contribution rate shall not be reduced below the contribution rate determined by the June 30, 2013 actuarial valuation, which was 16.97% of covered payroll. All amounts contributed pursuant to this policy that exceed the computed employer normal cost shall be applied to the unfunded accrued liability.

September 12, 2014

Board of Trustees  
Missouri State Employees'  
Retirement System  
907 Wildwood Drive  
Jefferson City, Missouri 65102

**Re: Annual Actuarial Valuation as of June 30, 2014**

Dear Board Members:

The results of the June 30, 2014 **Annual Actuarial Valuation** of the Missouri State Employees' Retirement System are presented in this report. The purposes of the valuation were to measure the System's funding progress and to determine the level cost employer contribution rate for the fiscal year beginning July 1, 2015. Disclosures under the Governmental Accounting Standards Board (GASB) Statement No. 67 will be issued in a separate report.

**Your attention is directed particularly** to the Executive Summary and discussion in Section A.

The valuation was based upon data, furnished by the MOSERS' staff, concerning active, inactive and retired members along with pertinent financial information and plan provisions. The complete cooperation of the MOSERS' staff in furnishing materials requested is hereby acknowledged with appreciation. We checked for internal and year-to-year consistency, but did not otherwise audit the data. We are not responsible for the accuracy or completeness of the information provided by MOSERS.

The valuation results summarized in this report involve actuarial calculations that require assumptions about future events. We believe that the assumptions and methods used in this report are reasonable and appropriate for the purpose for which they have been used. However, other assumptions and methods could also be reasonable and could result in materially different results. We have included sensitivity analysis for the assumed rate of investment return. Because it is not possible or practical to consider every possible contingency, we may use summary information, estimates or simplifications of calculations to facilitate the modeling of future events. We may also exclude factors or data that are deemed to be immaterial.

To the best of our knowledge the information contained in this report is accurate and fairly presents the actuarial position of the Missouri State Employees' Retirement System as of the valuation date. All calculations have been made in conformity with generally accepted actuarial principles and practices, Governmental Accounting Standards and with the Actuarial Standards of Practice issued by the Actuarial Standards Board.

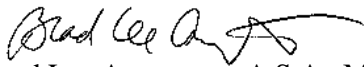
This report was prepared at the request of the Board and is intended for use by the Retirement System and those designated or approved by the Board. This report may be provided to parties other than the System only in its entirety. This report should not be relied on for any purpose other than the purpose described.

Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as: plan experience differing from that anticipated by the economic and demographic assumptions; changes in economic or demographic assumptions; increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period or additional cost or contribution requirements based on the plan's funded status); and changes in plan provisions or applicable law. Due to the limited scope of our assignment, we did not perform an analysis of the potential range of such future measurements.

The actuarial assumptions are adopted by the Board. The financial assumptions used in making the valuations are shown in Section C of this report. Assumptions concerning future experience are needed for computing employer contribution rates. As time passes and actual experience develops, assumed and actual experiences are compared. From time to time one or more of the assumptions about the future may be changed by the Board after consulting with the actuary and the investment consultant.

The actuaries submitting this report, Brad Armstrong and David Kausch, are independent of the plan sponsor and are Members of the American Academy of Actuaries (M.A.A.A.) and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein.

Respectfully submitted,



Brad Lee Armstrong, A.S.A., M.A.A.A.  
Senior Consultant & Actuary



David T. Kausch, F.S.A., M.A.A.A.  
Consultant & Actuary

BLA/DTK:bd

## Table of Contents

	<u>Page</u>
<b>Section A</b>	Introduction
	Executive Summary/Board Summary..... 1
	Discussion ..... 2
<b>Section B</b>	Funding Results
	Principle Valuation Results..... 6
	Employer Contribution Rate ..... 7
	Sensitivity Analysis ..... 8
	Actuarial Liabilities ..... 9
	Unfunded Actuarial Accrued Liability ..... 10
	Actuarial Balance Sheet..... 12
	Comparative Schedules ..... 13
	Experience Gain/(Loss) ..... 19
	Active Member Experience by Decrement..... 27
<b>Section C</b>	Fund Assets
	Development of Actuarial Value of Assets..... 33
	Asset Summary ..... 34
	Comparative Graph..... 35
<b>Section D</b>	Projections
	Nature of Actuarial Projections..... 36
	Basic Cash Flow Projections ..... 37
<b>Section E</b>	Participant Data
	Retirees Lives..... 41
	Active and Inactive members..... 44
<b>Section F</b>	Methods & Assumptions..... 48
<b>Section G</b>	Plan Provisions..... 58
<b>Section H</b>	Glossary ..... 67
<b>Section I</b>	History of Results from the Investment Universe..... 69

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SECTION A  
INTRODUCTION

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## Executive Summary

### (\$ in Millions)

Valuation Date	June 30, 2014	June 30, 2013
Contribution for Fiscal Year Ending	June 30, 2016	June 30, 2015
Required Employer Contributions		
• Annual Amount (Estimated)	\$ 322.0	\$ 338.5
• Percentage of Covered Payroll	15.95 %	16.97 %
Membership		
Number of		
• Active Members	50,621	50,833
• Retirees and Beneficiaries	41,000	39,139
• Inactive, Nonretired Members	20,129	19,836
• Total	<u>111,750</u>	<u>109,808</u>
• Reported Payroll	\$ 1,902.7	\$ 1,880.2
Assets		
• Market Value	\$ 9,137	\$ 7,994
• Actuarial Value	8,638	8,096
• Return on Market Value	18.99 %	10.52 %
• Return on Actuarial Value	11.15 %	7.33 %
• Ratio – Actuarial Value to Market Value	94.54 %	101.28 %
Actuarial Information		
• Actuarial Accrued Liability (AAL)	\$ 11,495	\$ 11,135
• Unfunded Actuarial Accrued Liability (UAAL)	2,857	3,038
• Funded Ratio	75.1 %	72.7 %
• Employer Normal Cost %	6.89 %	7.16 %
• UAAL as % of Reported Payroll	9.06 %	9.81 %
• Amortization Period	30 years	30 years
• Ratio of Assets to Payroll	4.5	4.3
• Ratio of Liability to Payroll	6.0	5.9

#### Highlights/Changes

- No changes to benefit provisions.
- No changes to actuarial assumptions.
- There was a change in the asset valuation method described on page 4.
- Effect of asset gains bolstered by an overall liability gain.
- The aggregate experience gain/loss was \$263 million.

The executive summary provides an overview of the valuation report.  
It cannot be used as a substitute for a thorough reading of the full report.

## Discussion

### Actuarial Valuation

This is the actuarial valuation of the Missouri State Employees' Retirement System, prepared as of June 30, 2014. Valuations are prepared annually as of June 30, the last day of the Missouri State Employees' Retirement System's plan and fiscal year.

The primary purposes of the valuation report are: to measure the plan's liabilities, to determine the required statutory employer contribution rate based upon the System's funding policy, and to analyze changes in the Missouri State Employees' Retirement System's actuarial position.

### Financing Objectives

The Missouri State Employees' Retirement System is supported by member contributions, employer contributions, and net earnings on the investments of the fund. The member contribution rate is set by law at 4.0% of the member's compensation for members hired on or after January 1, 2011, while the employer contribution is determined by the actuarial valuation. The computed employer contribution rate is dependent upon timely receipt of both member and employer contributions.

The combined member and employer contributions are intended to be sufficient to pay the normal cost and to amortize the Unfunded Actuarial Accrued Liability (UAAL) as of June 30, 2014 over a period of 30 years. The Board adopted a new policy which closes the amortization period beginning in fiscal year 2016 and ending fiscal year 2045.

### Employer Contribution Requirement, Experience and Funded Ratio

The required employer contribution rate for the fiscal year ending June 30, 2016 is 15.95% of covered payroll, estimated to result in a contribution of \$322.0 million. This compares with an employer contribution rate for the fiscal year ending June 30, 2015 of 16.97% of covered payroll, estimated to result in a contribution of \$338.5 million.

The plan experienced a gain of \$232 million, which decreased the required employer contribution rate by 0.79% of covered payroll. Of this change, (0.06)% was due to decrement experience losses and 0.85% was due to recognition of asset gains. The normal cost decrease from new entrants under MSEP 2011 (decreases rate), the payroll growth less than assumed (increases rate) and open amortization (decreases rate) combined to decrease the rate by an additional 0.23% of covered payroll. If the amortization period were lowered to 24 years, the employer contribution rate would be 17.01% of payroll, in line with last year's rate.

As already mentioned, experience was favorable in the aggregate this year. Areas contributing to the gain were recognized asset gains, lower pay increases, lower retiree reserve transfers, higher retiree mortality (by age and gender), and lower COLAs offset by losses due to more BackDROP payments and lower turnover. Experience impacts both the contribution requirement and the progress of the funded ratio. Section B has more analysis of the actuarial gains and losses.

The funded ratio and market value percent funded amounts are shown below:

<b>Valuation Date</b>	<b>June 30, 2014</b>	<b>June 30, 2013</b>
Actuarial Value of Assets (AVA)	\$8,638	\$8,096
Actuarial Accrued Liabilities (AAL)	\$11,495	\$11,135
<b>AVA / AAL (Funded Ratio)</b>	<b>75.1%</b>	<b>72.7%</b>
Market Value of Assets (MVA)	\$9,137	\$7,994
<b>MVA / AAL</b>	<b>79.5%</b>	<b>71.8%</b>

See Section B for a history of the funded ratios.

### Variability of Future Contribution Rates

The Actuarial Cost Method used to determine the contribution rate is intended to produce contribution rates which are generally level as a percent-of-payroll. Even so, when experience differs from the assumptions, as it often does, the employer's contribution rate can vary significantly from year-to-year.

One risk-metric for contribution rate volatility is the ratio of assets to payroll, which is currently 4.5. The impact of this metric on the variability of contribution rates is illustrated in the following table.

<b>Sensitivity of Contribution Rate</b>	<b>50% Confidence</b>	<b>90% Confidence</b>
	<b>Interval</b>	<b>Interval</b>
a. Range of Rate of Return* (above or below 8.0%)	± 8.5 %	± 20.8 %
b. Ratio of Assets to Payroll	4.5	4.5
c. Range of Asset Gain/Loss as Percent of Pay (a x b)	± 38.3 %	± 93.7 %
d. Smoothed and Amortized as Percent of Pay	± 0.8 %	± 2.0 %

*\*Based on information as of June 30, 2013.*

Over time, if the year-to-year gains and losses offset each other, the unfunded contribution rate would be expected to remain level, but this does not always happen.

### Relationship to Market Value

The Market Value of Assets exceeds the Actuarial Value of Assets by \$499 million as of the valuation date (see Section C). This difference will be gradually recognized in the absence of offsetting losses.

If Market Value had been the basis for the valuation, the contribution rate would have been 14.26% and the funded ratio would have been 79.5%. This is an indication that absent future losses, the unrecognized asset gains are expected to reduce the contribution rate and increase the funded ratio over the next few years.

### Impact of the 2011 Plan

The employer normal cost for 2011 plan members is lower than for MSEP and MSEP 2000 members due to later retirement eligibility and 4% member contributions. As the 2011 plan members replace MSEP and MSEP 2000 members, the System's employer normal cost is expected to ultimately decline by approximately 3.7% of payroll relative to the June 30, 2014 valuation date.



**Benefit Provisions**

This valuation reflects benefits promised to members by statute as reported to us by the System's staff. There have been no changes since the prior valuation.

**Actuarial Assumptions and Methods (Other than Asset Valuation Method)**

In determining costs and liabilities, actuaries use assumptions about the future, such as rates of salary increase, probabilities of retirement, termination, death and disability, and an investment return assumption. The Board of Trustees sets the actuarial assumptions and methods taking into account recommendations made by the plan's actuary and other advisors. These assumptions and procedures were revised in 2012 following an analysis of plan experience for the 4-year period ending June 30, 2011.

Section G summarizes the current assumptions. There have been no changes to the assumptions used in this valuation. The most significant assumptions are (i) the assumed investment return, currently set at 8.00%, and (ii) the assumption regarding future payroll increases of 3% per year.

We believe the assumptions are internally consistent and are reasonable, based on the actual experience of MOSERS. These actuarial assumptions and methods comply with current actuarial standards of practice.

The results of the actuarial valuation are dependent on the actuarial assumptions used. Actual results can, and almost certainly will, differ as actual experience deviates from the assumptions. Even seemingly minor changes in the assumptions can materially change the liabilities, calculated employer contribution rates, and amortization periods.

In addition to the actuarial assumptions, the actuary makes use of an Actuarial Cost Method to allocate costs to particular years. In accordance with Missouri statutes, MOSERS uses the Entry Age Normal method. Theoretically, this method produces a level contribution rate pattern of funding over time, and thereby provides equity between various generations of taxpayers. We continue to believe this method is appropriate for the Missouri State Employees' Retirement System and consistent with the statutory funding objective. The actuarial accrued liability determined by the Entry Age Normal method is compared to the Actuarial Value of Assets. Any difference is amortized as a level percentage of payroll over a period of 30 years as of the June 30, 2014 valuation determining contribution requirements for the fiscal year ending June 30, 2016. After fiscal year 2016, the amortization period will decrease by 1 each year. The prior year's open amortization policy decreased this year's employer contribution rate by 0.13% of covered payroll.

**Assets**

System assets are held in trust. The Missouri State Employees' Retirement System staff have provided the asset information used in this valuation.

Section C contains several exhibits summarizing the plan's assets, presents a summary of the Market Value of Assets held by the fund, shows the allocation of assets held for investment and shows a reconciliation of the assets from the last valuation date to the current valuation date.

Section C also shows the development of the Actuarial Value of Assets on page 33. The Actuarial Value of Assets is a smoothed Market Value. A smoothed value is used in order to dampen some of the year-to-year fluctuations in valuation results that would occur if the Market Value were used instead. The method used phases in differences between the actual and expected market returns over three years.

The expected return is determined using the 8.00% assumption and the plan's Actuarial Value of Assets, adjusted for contributions received and benefits and refunds paid. Both the actual and expected returns are computed net of investment expenses.

Market experience during the year ended June 30, 2014 was above expectations. The asset valuation method currently in use by MOSERS smoothes investment gains and losses over an open period of 3 years and, in addition, requires the smoothed value of assets to be within a certain corridor limit of the market value of assets. The corridor limit is currently 80% to 125%.

The Actuarial Value of Assets is currently 95% of the Market Value of Assets. Over any short time period, a disparity between Actuarial Value and Market Value may appear, but in the long-run, we would expect the Actuarial Value and the Market Value to continue to track each other fairly closely.

The investment return rate for fiscal year 2014 on Market Value was 18.99% based on an approximation, while it was 11.15% on Actuarial Value. These figures differ because of the asset valuation procedure described above.

### **Active Member Data**

The number of active members decreased from 50,833 last year to 50,621 this year. Total payroll increased 1.20% from \$1,880.2 million last year to \$1,902.7 million this year. Lower than expected payroll growth increased the contribution rate by 0.16% of covered payroll. The increase in the number of active members participating under MSEP 2011 decreased the Normal Cost contribution rate by 0.27% of covered payroll.

### **GASB Disclosures**

This report no longer includes Governmental Accounting Standards Board Statement No. 25 (GASB 25). GASB 25 has been superceded by GASB 67 effective for the fiscal year ending June 30, 2014. The new GASB Accounting Standards for pension plans, Statement No. 67, are required for the plan year ending June 30, 2014. The GASB 67 disclosures will be issued in a separate report due to the expressed intent of GASB to disconnect reporting requirements from funding requirements.

### **Conclusion**

**Based on the results of the June 30, 2014 regular annual actuarial valuation, it is our opinion that the Missouri State Employees' Retirement System continues to be funded in accordance with actuarial principles of level percent-of-payroll financing.**

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SECTION B  
FUNDING RESULTS

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**Principal Valuation Results**  
**As of June 30**  
**(\$ in Millions)**

<b>Valuation Date:</b>	<b>2014</b>	<b>2013</b>
<b>A. Number of Participants</b>		
Active Members	50,621	50,833
Vested Deferred Members	20,129	19,836
Retirees and Beneficiaries	41,000	39,139
Total	111,750	109,808
Covered Annual Payroll	\$ 1,903	\$ 1,880
 <b>Development of Contribution Rate</b>		
<b>For Fiscal Year Ending</b>		
	<b>2016</b>	<b>2015</b>
<b>B. Normal Cost %</b>		
Total	8.21 %	8.31 %
Member	1.32 %	1.15 %
Employer	6.89 %	7.16 %
 <b>C. Unfunded Actuarial Accrued Liabilities (UAAL)</b>		
Actuarial Accrued Liability	\$ 11,495	\$ 11,135
Actuarial Value of Assets	8,638	8,096
UAAL	\$ 2,857	\$ 3,038
% of Payroll Required to Amortize UAAL*	9.06 %	9.81 %
 <b>D. Total Computed Employer Contribution Rate</b>		
	15.95%	16.97%
 <b>E. Estimated Dollar Contribution#</b>		
	\$ 322.0	\$ 338.5

\* This corresponds to an amortization factor of 15.77495 applied to the unfunded actuarial accrued liability at the beginning of the applicable fiscal year assuming payroll growth of 3% per year.

# Illustrative only. Estimated employer contribution amounts (shown in \$millions) are based on the Total Computed Employer Contribution Rates shown and valuation payroll projected two years to the applicable fiscal year using the valuation assumptions of 3%.

**Computed Employer Contribution Rate  
Expressed as Percents of Active Member Payroll  
for the Fiscal Year Ending June 30, 2016  
Actuarial Valuation Results as of June 30, 2014**

	Contribution Expressed as Percents of Payroll for the Fiscal Year		
	2015/16		
	Pre-2011 Hires	Post-2010 Hires@	Weighted Average
A. Normal Cost			
(1) Service retirement benefits	5.75 %	3.87 %	5.13 %
(2) Vested termination benefits	1.68	0.78	1.38
(3) Disability benefits	0.72	0.74	0.73
(4) Survivor benefits	0.18	0.22	0.19
(5) Refunds	0.00	1.24	0.41
(6) Administrative expenses	0.37	0.37	0.37
(7) Total [(1) + (2) + (3) + (4) + (5) + (6)]	8.70	7.22	8.21
B. Less Member Contributions	0.00	4.00	1.32
C. Employer Normal Cost [A(7) - B]	8.70	3.22	6.89
D. Unfunded Actuarial Accrued Liabilities (UAAL) (30-year level percent-of-payroll amortization*)			9.06
<b>E. TOTAL COMPUTED EMPLOYER CONTRIBUTION RATE [C. + D.]</b>			<b>15.95 %</b>
<b>ESTIMATED EMPLOYER CONTRIBUTION (\$Millions)#</b>			<b>\$322.0</b>

The amortization period is a 30-year closed period beginning with the June 30, 2014 valuation as described in the Funding Policy adopted by the Board June 30, 2013.

@ Based on assumptions for new hires. Normal cost for post-2010 hires will depend on future hiring practices and is likely to change as actual experience emerges.

\* This corresponds to an amortization factor of 15.77495 applied to the unfunded actuarial accrued liability at the beginning of the applicable fiscal year assuming payroll growth of 3% per year.

# Illustrative only. Estimated employer contribution amounts (shown in \$millions) are based on the Total Computed Employer Contribution Rates shown and valuation payroll projected two years to the applicable fiscal year using the valuation assumptions of 3%. The comparable estimated employer contribution amount from last year's valuation is \$338.5 million.

## Sensitivity Analysis

There are several actuarial assumptions used in the valuation. Differences between expected and actual experience result in gains and losses from year to year. The most significant assumption in regards to gains and losses is the rate of return assumption. This illustration shows sensitivity of the valuation results to the investment return assumption by reproducing the valuation at investment return assumptions 7%, 7.5%, 8.5% and 9.0%.

(All figures are in \$millions)

<b>Investment Return Assumption</b>	<b>7.0%</b>	<b>7.5%</b>	<b>8.0%</b>	<b>8.5%</b>	<b>9.0%</b>
Employer Normal Cost Rate	8.93 %	7.85 %	6.89 %	6.05 %	5.32 %
UAAL Rate	12.06	10.60	9.06	7.48	5.87
Employer Contribution Rate	20.99 %	18.45 %	15.95 %	13.53 %	11.19 %
Projected \$ Contribution (ER)	\$ 423.7	\$ 372.5	\$ 322.0	\$ 273.0	\$ 225.9
Actuarial Accrued Liability	\$ 12,794	\$ 12,119	\$ 11,495	\$ 10,921	\$ 10,399
Actuarial Value of Assets	\$ 8,638	\$ 8,638	\$ 8,638	\$ 8,638	\$ 8,638
Unfunded Actuarial Accrued Liability	\$ 4,156	\$ 3,481	\$ 2,857	\$ 2,283	\$ 1,761
Funded Ratio	67.5 %	71.3 %	75.1 %	79.1 %	83.1 %

## Actuarial Liabilities June 30, 2014

Actuarial Present Value, June 30, for	(1) Actuarial Present Value	(2) Portion Covered By Future Normal Cost Contributions	(3) Actuarial Accrued Liabilities (1) - (2)
<b>Active Members</b>			
Service retirement benefits based on service rendered before and likely to be rendered after valuation date	\$4,811,108,995	\$640,062,176	\$ 4,171,046,819
Disability benefits likely to be paid to present active members who become totally and permanently disabled	139,096,172	87,350,868	51,745,304
Survivor benefits likely to be paid to widows and children of present active members who die before retiring	96,567,078	22,514,591	74,052,487
Separation benefits likely to be paid to present active members	397,547,019	186,558,720	210,988,299
Refunds likely to be paid to present active members	<u>34,900,727</u>	<u>32,767,597</u>	<u>2,133,130</u>
Active Member Totals	\$5,479,219,991	\$969,253,952	\$ 4,509,966,039
<b>Members on Leave of Absence &amp; LTD</b>			
Service retirement benefits based on service rendered before the valuation date			90,259,542
<b>Terminated Vested Members</b>			
Service retirement benefits based on service rendered before the valuation date			546,617,537
<b>Retired Lives</b>			6,347,032,329
<b>BackDROP Installment Payments Incurred, but not yet paid</b>			<u>696,388</u>
TOTAL ACTUARIAL ACCRUED LIABILITY			\$11,494,571,835
ACTUARIAL VALUE OF ASSETS			<u>8,637,758,955</u>
UNFUNDED ACTUARIAL ACCRUED LIABILITY			<u>\$ 2,856,812,880</u>
FUNDED RATIO			75.1%

**Determination of the  
Unfunded Actuarial Accrued Liability (UAAL)  
Amortization  
(\$ in Millions)**

(1) Contribution Rate as a Percent-of-Payroll for the Year after the Valuation Date (as determined by the prior valuation)	
(a) Total Normal Cost Rate Beginning of Year	8.31%
(b) UAAL Beginning of Year	<u>9.81%</u>
(c) Total Contribution Rate Beginning of Year	18.12%
(2) UAAL on Valuation Date	\$ 2,856.8
(3) Expected Interest on UAAL [ (2) * 8.0% ]	\$ 228.5
(4) Projected Payroll for the Year After the Valuation Date	\$ 1,959.8
(5) Total Normal Cost [ (1)(a) x (4) ]	\$ 162.9
(6) 1/2 Year Interest on Normal Cost [ (5) / 2 * 8.0% ]	\$ 6.5
(7) Total Expected Contributions [ (1)(c) x (4) ]	\$ 355.1
(8) 1/2 Year Interest on Contributions [ (7) / 2 * 8.0% ]	\$ 14.2
(9) Projected UAAL [ (2) + (3) + (5) + (6) - (7) - (8) ]	\$ 2,885.4
(10) Amortization Factor (30 years)	15.77495
(11) Projected Payroll for Second Year after Valuation Date	\$ 2,018.6
(12) UAAL Contribution Rate [ (9) / (10) / (11) ]	9.06%



**Financing Unfunded Actuarial Accrued Liabilities  
Which Were Calculated Using a Wage Inflation Assumption of 3.0% and  
an Investment Return Assumption of 8.0% Compounded Annually**

*Level % of Payroll Amortization*

Fiscal Year June 30	Projected Active Member Payroll	Unfunded Actuarial Accrued Liability	UAAL Adjusted for Wage Inflation	Amortization Years Remaining	Annual Contributions		UAAL as % of Payroll	BOY Funded Ratio
					Dollars	% of Payroll		
-----\$ in millions-----								
2014	\$1,960	\$2,857	\$2,857	30	\$192	9.81 %	145.77 %	75.1 %
2015	2,019	2,886	2,801	30	183	9.06	142.95	75.6
2016	2,079	2,926	2,758	29	188	9.06	140.74	76.0
2017	2,142	2,964	2,713	28	194	9.06	138.43	76.3
2018	2,206	3,000	2,665	27	200	9.06	136.00	76.6
2019	2,272	3,032	2,616	26	206	9.06	133.46	76.8
2020	2,340	3,061	2,563	25	212	9.06	130.79	77.1
2021	2,410	3,085	2,508	24	218	9.06	128.00	77.3
2022	2,483	3,105	2,451	23	225	9.06	125.07	77.5
2023	2,557	3,119	2,391	22	232	9.06	121.99	77.7
2024	2,634	3,128	2,328	21	239	9.06	118.77	78.0
2025	2,713	3,130	2,261	20	246	9.06	115.39	78.2
2026	2,794	3,125	2,192	19	253	9.06	111.84	78.5
2027	2,878	3,112	2,119	18	261	9.06	108.13	78.7
2028	2,964	3,090	2,043	17	269	9.06	104.23	79.1
2029	3,053	3,058	1,963	16	277	9.06	100.15	79.4
2030	3,145	3,015	1,879	15	285	9.06	95.86	79.8
2031	3,239	2,960	1,791	14	294	9.06	91.37	80.3
2032	3,336	2,891	1,698	13	302	9.06	86.66	80.9
2033	3,437	2,809	1,602	12	311	9.06	81.73	81.5
2034	3,540	2,709	1,500	11	321	9.06	76.55	82.2
2035	3,646	2,593	1,394	10	330	9.06	71.12	83.1
2036	3,755	2,457	1,282	9	340	9.06	65.43	84.0
2037	3,868	2,300	1,165	8	350	9.06	59.46	85.1
2038	3,984	2,119	1,043	7	361	9.06	53.20	86.4
2039	4,103	1,914	914	6	372	9.06	46.63	87.8
2040	4,226	1,680	779	5	383	9.06	39.75	89.4
2041	4,353	1,416	638	4	394	9.06	32.54	91.1
2042	4,484	1,120	489	3	406	9.06	24.97	93.1
2043	4,618	787	334	2	419	9.06	17.04	95.2
2044	4,757	415	171	1	431	9.06	8.72	97.5
2045	4,900	0	0	0	0	0.00	0.00	100.0

## Actuarial Balance Sheet as of June 30, 2014

### Assets and Present Value of Expected Future Contributions

A. Present Actuarial Value of Assets		
1. Net Assets from System Financial Statements	\$ 9,136,781,826	
2. Adjustment for Valuation Assets	(499,022,871)	
3. Actuarial Value of Assets	8,637,758,955	
B. Actuarial Present Value of Expected Future Employer Contributions		
1. For Normal Costs	862,522,791	
2. For Unfunded Actuarial Accrued Liability	2,856,812,880	
3. Total	3,719,335,671	
C. Actuarial Present Value of Expected Future Member Contributions		106,731,161
D. Total Present and Expected Future Resources		\$ 12,463,825,787

### Present Value of Expected Future Benefit Payments

A. To Retirees and Beneficiaries		
1. Annual Pensions	\$ 6,347,032,329	
2. Members on Leave of Absence & LTD	90,259,542	
3. BackDROP Installment Payments Incurred, but not yet paid	696,388	
4. Total	6,437,988,259	
B. To Vested Terminated Members		546,617,537
C. To Present Active Members		
1. Allocated to Service Rendered Prior to Valuation Date – Actuarial Accrued Liability	4,509,966,039	
2. Allocated to Service likely to be Rendered after Valuation Date	969,253,952	
3. Total	5,479,219,991	
D. Total Actuarial Present Value of Expected Future Benefit Payments		\$ 12,463,825,787

## Comparative Schedule

Valuation Date June 30	Active Members				Retired Lives					Accrued Liability	Valuation Assets	UAAL	Percent Funded
	Number	Payroll \$ Millions	Average Salary		Number		Annual Benefits						
			\$	% Incr.	Retired	Active/ Retired	\$ Million	% of Payroll					
											-----million-----		
1993	\$47,954	\$1,063	\$22,172	0.3 %	\$13,115	3.7	\$ 79.4	7.5 %	\$2,447	\$2,237	\$ 210	91.4 %	
1994 (2)	49,436	1,125	22,754	2.6	13,651	3.6	96.2	8.6	2,919	2,425	494	83.1	
1995	50,524	1,199	23,730	4.3	14,384	3.5	104.9	8.8	3,151	2,649	502	84.1	
1996 (1)	51,425	1,268	24,650	3.9	15,004	3.4	116.2	9.2	3,440	2,928	512	85.1	
1997 (1)(2)(3)	52,737	1,360	25,782	4.6	15,609	3.4	130.4	9.6	4,484	3,581	903	79.9	
1998	54,544	1,460	26,762	3.8	16,251	3.4	142.4	9.8	4,919	4,211	708	85.6	
1999 (2)	56,158	1,565	27,860	4.1	17,117	3.3	161.3	10.3	5,506	4,909	597	89.2	
2000 (1)	57,774	1,684	29,143	4.6	18,196	3.2	177.0	10.5	5,921	5,217	704	88.1	
2001 (1)	58,431	1,758	30,090	3.3	20,237	2.9	227.4	12.9	6,065	5,881	184	97.0	
2002 (3)	58,616	1,773	30,253	0.5	21,502	2.7	256.6	14.5	6,294	6,033	261	95.9	
2003 (2) (3)	57,558	1,740	30,229	(0.1)	22,872	2.5	287.1	16.5	6,662	6,057	605	90.9	
2004 (1)	55,914	1,737	31,074	2.8	24,757	2.3	324.6	18.7	7,230	6,118	1,112	84.6	
2005 (3)(4)	55,944	1,807	32,293	3.9	25,780	2.2	348.1	19.3	7,578	6,435	1,143	84.9	
2006	54,493	1,777	32,615	1.0	27,052	2.0	373.6	21.0	8,013	6,837	1,176	85.3	
2007	54,363	1,847	33,969	4.2	28,692	1.9	406.4	22.0	8,500	7,377	1,123	86.8	
2008 (1)	54,542	1,917	35,139	3.4	30,132	1.8	434.6	22.7	9,128	7,838	1,290	85.9	
2009 (1) (3)	55,057	2,002	36,370	3.5	31,637	1.7	465.4	23.2	9,495	7,876	1,619	83.0	
2010 (1)	53,478	1,945	36,372	0.0	33,251	1.6	493.7	25.4	9,853	7,923	1,930	80.4	
2011 (1)	51,660	1,876	36,306	(0.2)	35,315	1.5	525.6	28.0	10,124	8,022	2,102	79.2	
2012 (1)	51,332	1,864	36,314	0.0	37,308	1.4	558.6	30.0	10,794	7,897	2,897	73.2	
2013 (3)	50,833	1,880	36,988	1.9	39,139	1.3	589.9	31.4	11,135	8,096	3,039	72.7	
<b>2014</b>	<b>50,621</b>	<b>1,903</b>	<b>37,588</b>	<b>1.6</b>	<b>41,000</b>	<b>1.2</b>	<b>618.7</b>	<b>32.5</b>	<b>11,495</b>	<b>8,638</b>	<b>2,857</b>	<b>75.1</b>	

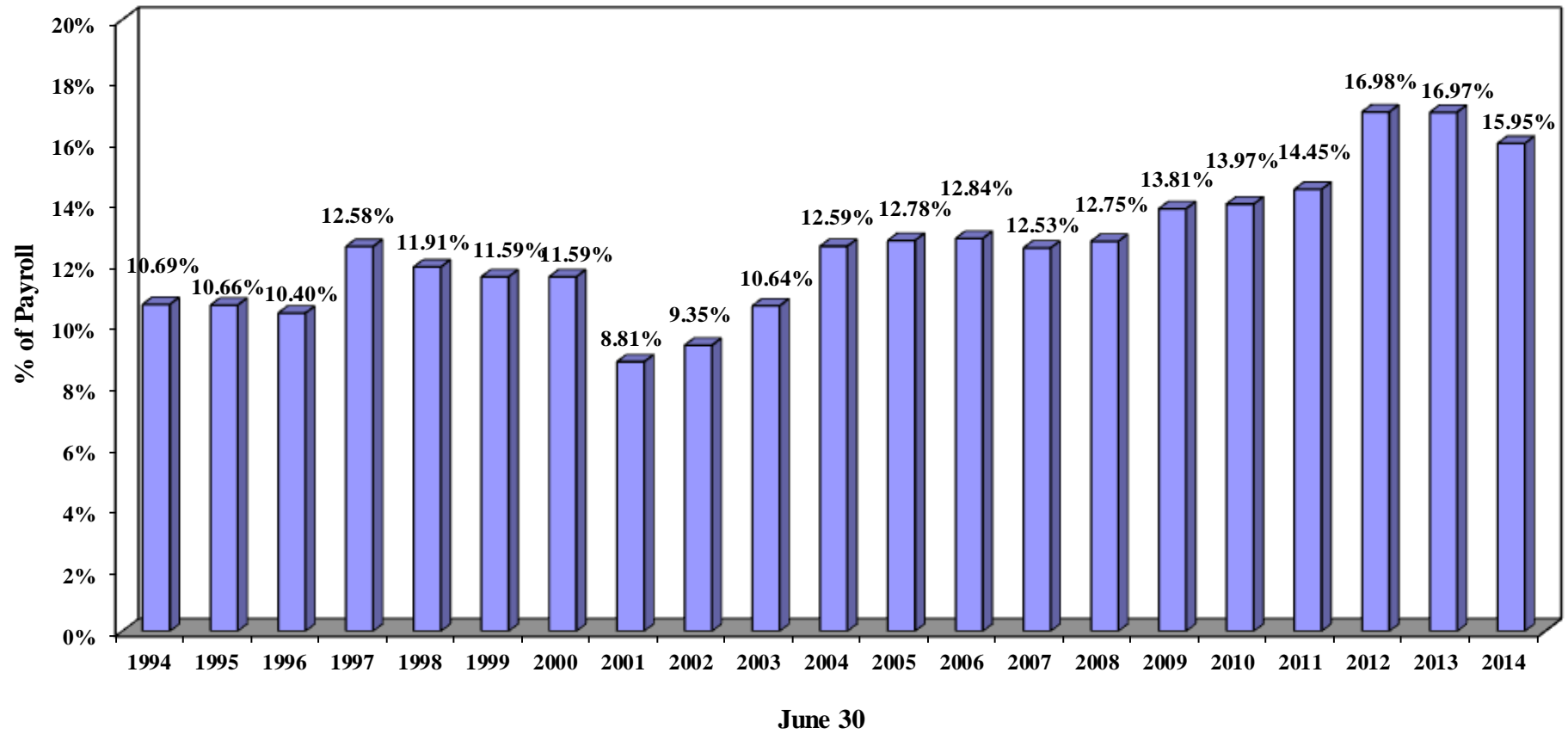
(1) After changes in assumptions.

(2) After changes in benefit provisions.

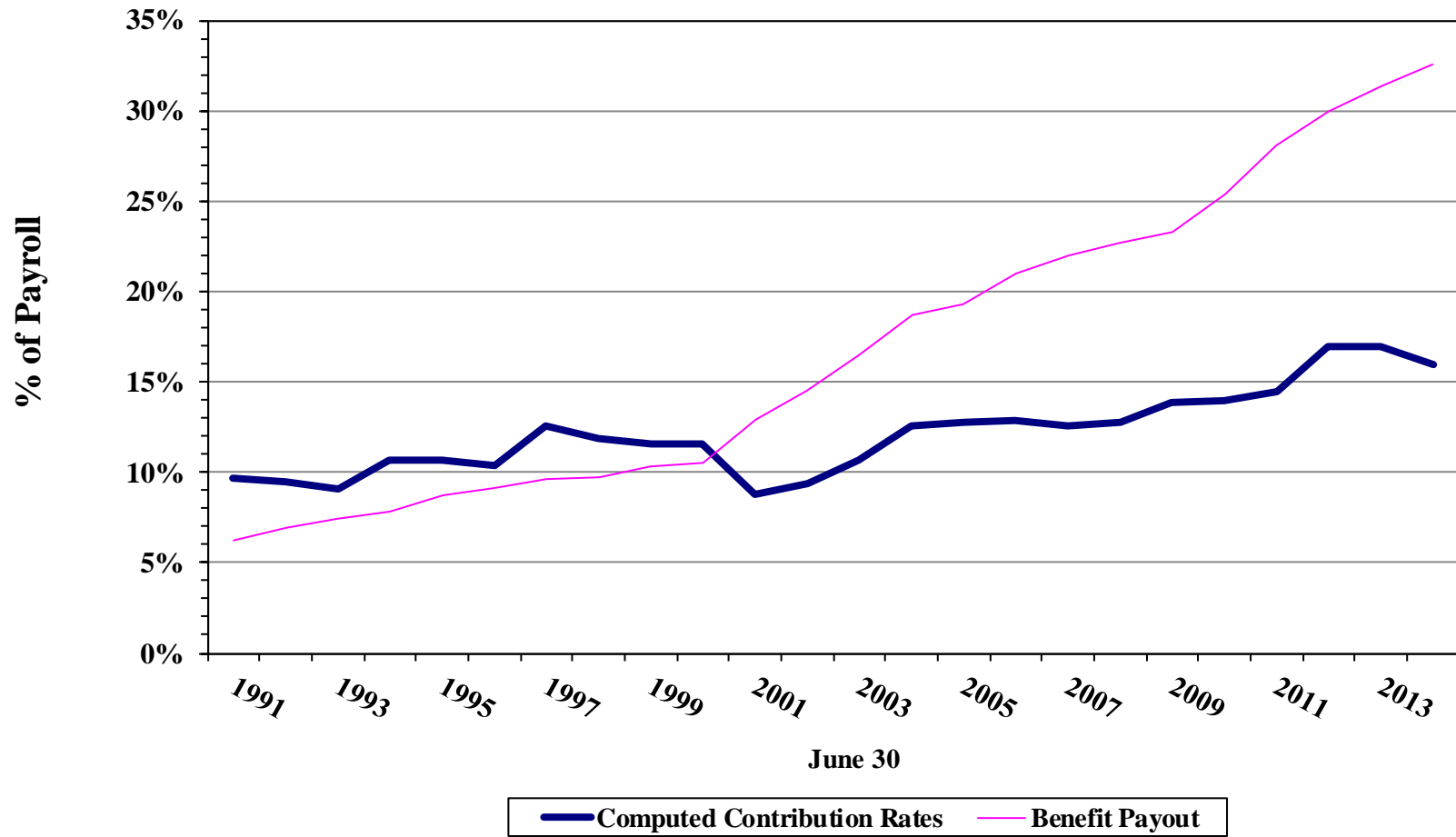
(3) After changes in methods.

(4) Reflects the addition of the assets, liabilities, and members of the Administrative Law Judges Retirement System.

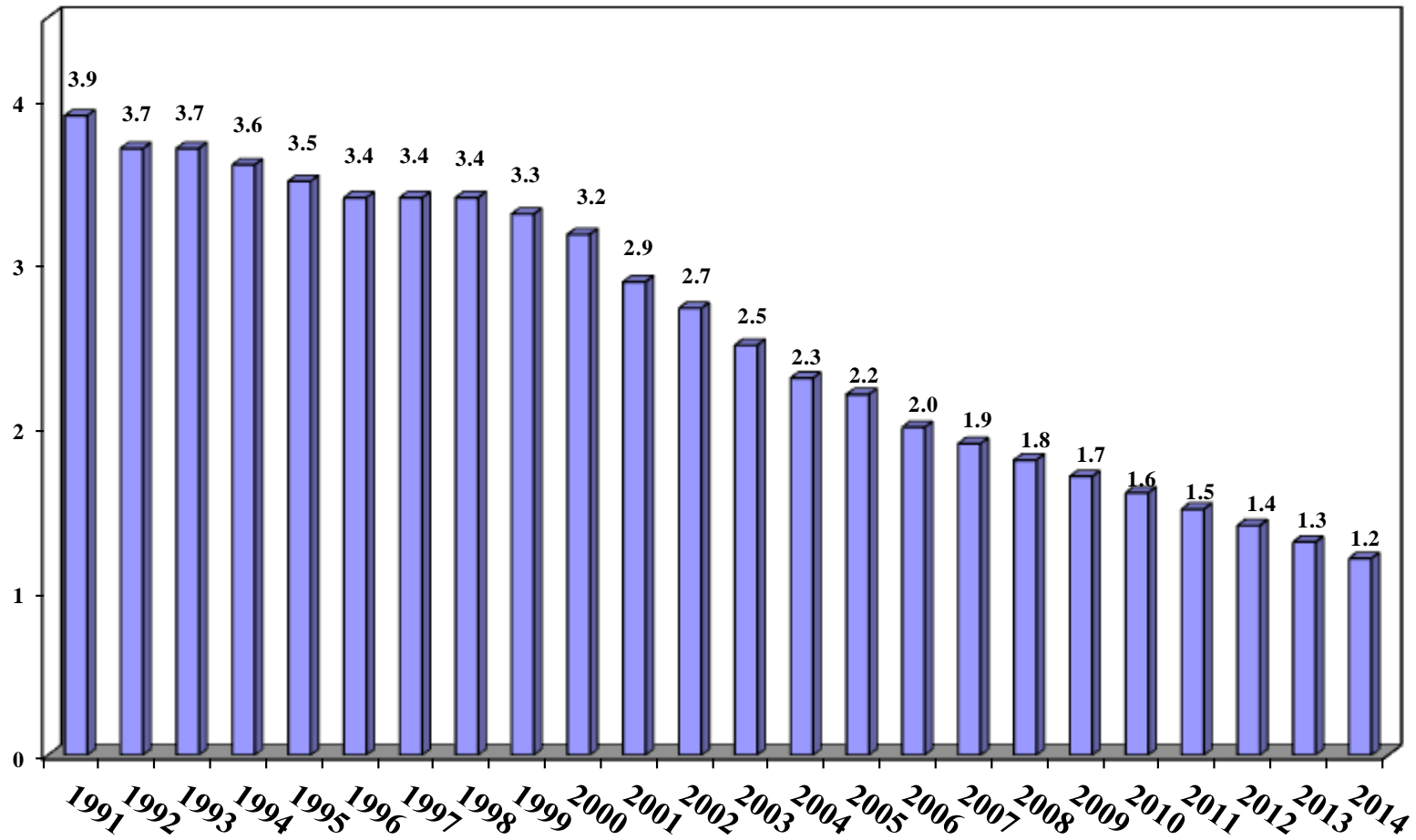
### Computed Employer Contribution Rates



### Contribution Rates vs. Benefit Payout

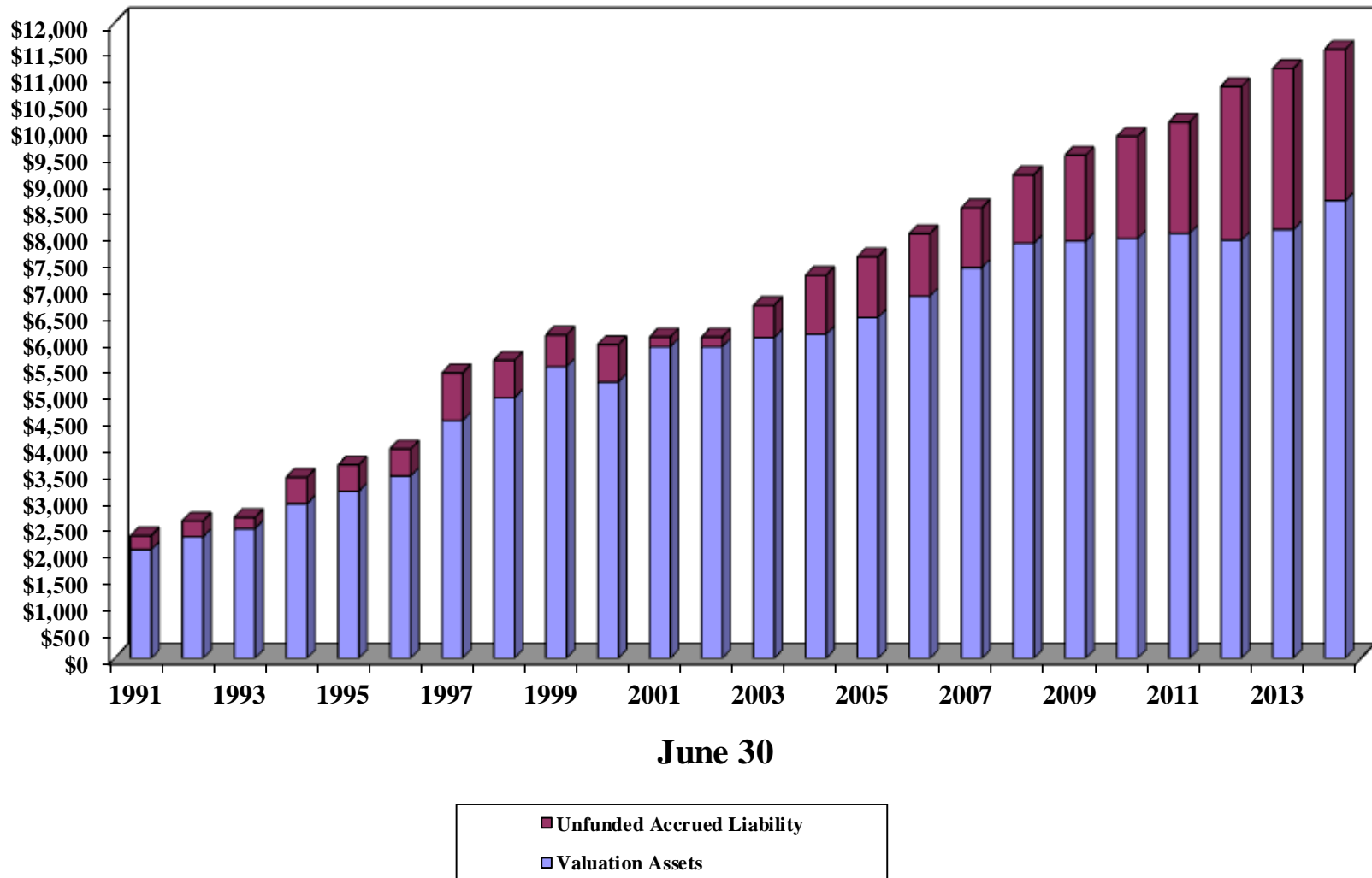


### Number of Active Members Per Benefit Recipient

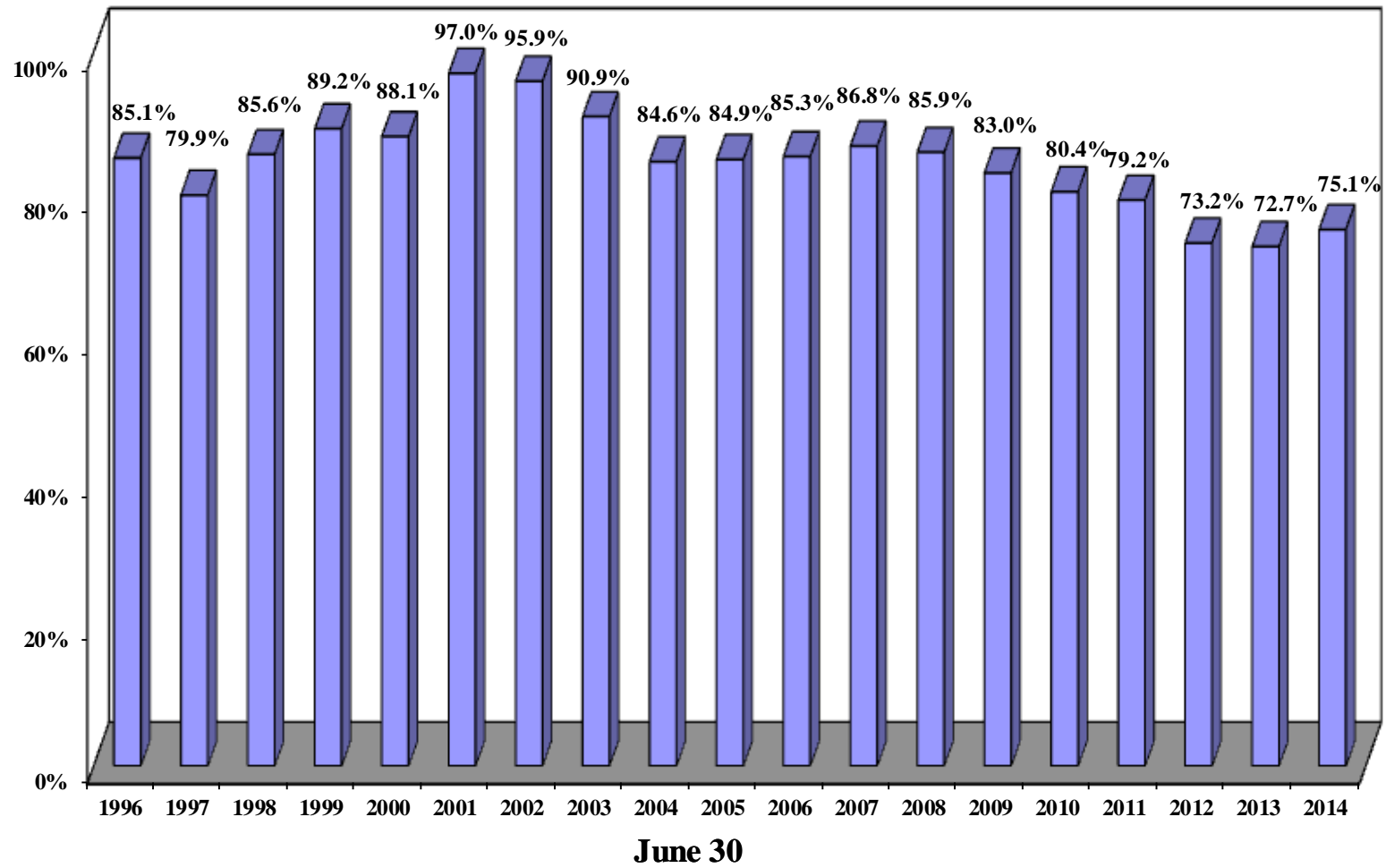


June 30

### Actuarial Value of Assets and Actuarial Accrued Liabilities (\$ in millions)



### Actuarial Value of Assets as Percents of Accrued Liabilities (Funded Ratio)





## Gain/Loss Analysis of Experience During Last Year

### Comments

***Purpose of Gain/Loss Analysis.*** Regular actuarial valuations provide valuable information about the composite change in unfunded actuarial accrued liabilities – whether or not the liabilities are increasing or decreasing, and by how much. However, valuations do not show the portion of the change attributable to each risk area within the retirement system financial mechanism: the rate of investment income on plan assets; the rates of withdrawal of active members who leave covered employment; the rates of mortality; the rates of disability; the rates of salary increases; and the assumed ages at actual retirement. In an actuarial valuation, assumptions are made as to what these rates will be for the next year and for decades in the future.

***The objective of a gain and loss analysis is to determine the portion of the change in unfunded actuarial accrued liabilities attributable to each risk area.***

The fact that actual experience differs from assumed experience is to be expected – the future cannot be predicted with precision. Changes in the valuation assumed experience for a risk area should be made when the differences between assumed and actual experience have been observed to be sizeable and persistent. One year's gain/loss analysis may or may not be indicative of ***long-term trends, which are the basis of financial assumptions.***

***2013 and 2014 Data.*** For the 2013 and 2014 valuations, active and retired member data were reported as of May 31. It was brought forward to June 30 by adding one month of service for all active members, adding the June COLA for certain retirees, and otherwise making no other adjustments. It was assumed for valuation purposes that there was no turnover among members and no new entrants during the month of June. Financial information was reported as of June 30. It is believed that this procedure resulted in a slight overstatement of total liabilities as of June 30, 2013 and June 30, 2014.

The expected and actual numbers of retirements, deaths, and terminations found on pages 27 through 32 reflect experience over the 12 month period from May 31, 2013 through May 31, 2014.

**Results from 2014 Plan Year.** There was a net experience gain this year, with the largest single identifiable source being investment gains. The table below summarizes historical MOSERS economic experience:

Period	Inflation As Measured By		Market Interest Credited to MOSERS Funds	Real Rate of Return	
	CPI	Increase in Average Salary@		Relative to CPI	Relative to Salaries
July 1, 2000 - June 30, 2001	3.2 %	5.1 %	(2.0) % *	(5.2) %	(7.1) %
July 1, 2001 - June 30, 2002	1.1	(2.1)	(6.4) *	(7.5)	(4.3)
July 1, 2002 - June 30, 2003	2.1	0.6	6.8 *	4.7	6.2
July 1, 2003 - June 30, 2004	3.3	4.2	17.2 *	13.9	13.0
July 1, 2004 - June 30, 2005	2.5	5.2	12.6 *	10.1	7.4
July 1, 2005 - June 30, 2006	4.3	2.1	11.5 *	7.2	9.4
July 1, 2006 - June 30, 2007	2.7	5.7	18.6 *	15.9	12.9
July 1, 2007 - June 30, 2008	5.0	5.3	1.4 *	(3.6)	(3.9)
July 1, 2008 - June 30, 2009	(1.4)	5.1	(19.3) *	(17.9)	(24.5)
July 1, 2009 - June 30, 2010	1.1	0.7	14.3 *	13.2	13.6
July 1, 2010 - June 30, 2011	3.5	1.0	21.3 *	17.8	20.4
July 1, 2011 - June 30, 2012	1.7	1.8	2.1 *	0.4	0.3
July 1, 2012 - June 30, 2013	1.7	3.2	10.5 *	8.8	7.3
July 1, 2013 - June 30, 2014	2.1	3.0	19.0 *	16.9	16.0

\* MOSERS' approximate rate of return based on market value.

@ For members active both at beginning and end of year.

The dollar amount of unfunded actuarial accrued liabilities (UAAL) is large in absolute dollars. However, the size should be viewed in the light of MOSERS' overall financial program. ***The ratio of unfunded actuarial accrued liabilities divided by active member payroll is significant.*** UAAL represents plan debt, while active member payroll is indicative of the state's capacity to amortize the UAAL – ***the ratio thus provides an index of relative condition.*** The smaller the ratio, the stronger the financial condition.

	<u>UAAL/Active Member Payroll</u>
June 30, 1997 after changes in benefits, assumptions, methods	.66
June 30, 1998	.49
June 30, 1999 after MSEP 2000	.38
June 30, 2000 after changes in assumptions	.42
June 30, 2001 after changes in assumptions	.10
June 30, 2002 after changes in methods	.15
June 30, 2003 after changes in benefits, methods	.35
June 30, 2004 after changes in assumptions	.64
June 30, 2005 after changes in assumptions	.63
June 30, 2006	.66
June 30, 2007	.61
June 30, 2008	.67
June 30, 2009	.81
June 30, 2010	.99
June 30, 2011	1.12
June 30, 2012	1.55
June 30, 2013	1.62
June 30, 2014	1.50

## Derivation of Experience Gain (Loss) Year Ended June 30, 2014

Actual experience will never coincide exactly with assumed experience (except by coincidence). Gains and losses may offset each other over a period of years, but sizeable year-to-year variations from assumed experience are common. Detail on the derivation of the experience gain (loss) is shown below.

	<b>\$ Millions</b>
(1) UAAL* at start of year	\$3,038.2
(2) Normal cost from last valuation	158.1
(3) Actual contributions (Employer and Member)	343.3
(4) Interest accrual: $(1) \times .08 + [(2) - (3)] \times (.08 / 2)$	235.6
(5) Expected UAAL before changes: $(1) + (2) - (3) + (4)$	3,088.6
(6) Change from any changes in benefits, assumptions, or methods	0.0
(7) Expected UAAL after changes: $(5) + (6)$	3,088.6
(8) Actual UAAL at end of year	2,856.8
(9) Gain (loss): $(7) - (8)$	231.8
- Gains (losses) in economic experience	320.1
- Gains (losses) from decrement experience and other	(88.3)
(10) Gain (loss) as percent of actuarial accrued liabilities at start of year (\$11,135)	2.1 %

\* *Unfunded Actuarial Accrued Liabilities.*

<b>Valuation Date June 30</b>	<b>Actuarial Gain (Loss) as a % of Beginning Accrued Liabilities</b>
2005	(3.4) %
2006	(0.1)
2007	1.0
2008	0.1
2009	(5.2)
2010	(4.0)
2011	(2.4)
2012	(4.7)
2013	(2.8)
<b>2014</b>	<b>2.1</b>

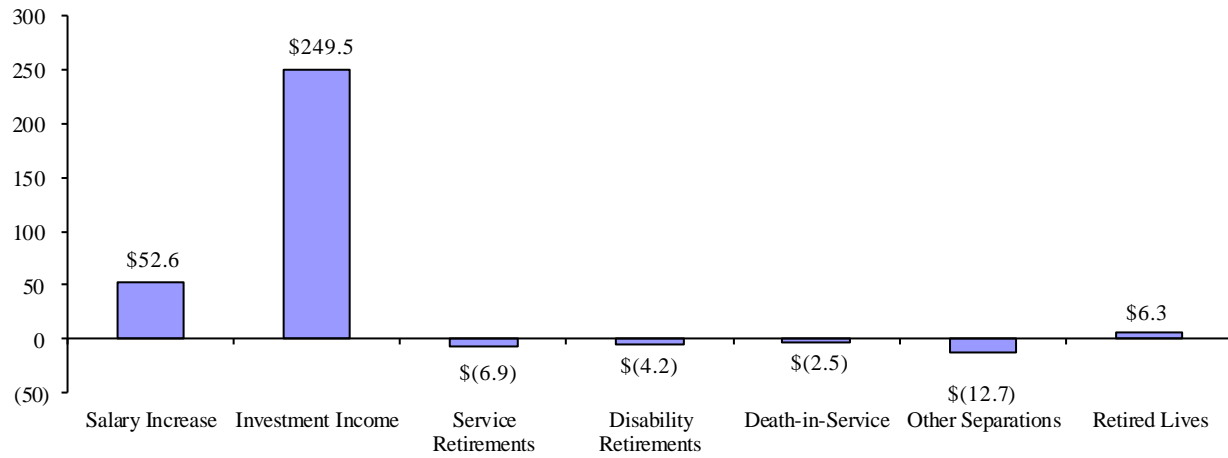
## Gains & (Losses) in Actuarial Accrued Liabilities During Plan Year 2013 - 2014

Type of Activity	-- Gain (Loss) for Year --	
	\$ in Millions	% of Accr. Liabilities*
<b><u>Decrement Experience:</u></b>		
<b><i>Service Retirements.</i></b> If members retire at older ages than assumed, there is a gain. If at younger ages, a loss.	\$ (6.9)	(0.1) %
<b><i>Disability Retirements.</i></b> The occurrence of a gain or loss depends upon the age at disability and the incidence of disability.	(4.2)	0.0
<b><i>Death-in-Service.</i></b> If there are fewer survivor claims than assumed at younger ages, there is a gain. If there are fewer survivor claims than assumed at older ages, there can be a loss.	(2.5)	0.0
<b><i>Other Separations.</i></b> If more actuarial liabilities are released by other separations than assumed, there is a gain. If smaller releases, a loss.	(12.7)	(0.1)
<b><i>Retired Lives.</i></b> If more deaths than assumed, there is a gain. If fewer deaths, a loss.	6.3	0.1
<b><u>Economic Experience:</u></b>		
<b><i>Salary Increases.</i></b> If there are smaller salary increases than assumed, there is a gain. If greater increases, a loss. If long service members have greater salary increases than assumed, there can be a loss even if average salary increases are less than assumed.	52.6	0.5
<b><i>Investment Income.</i></b> If there is greater investment income than assumed, there is a gain. If less income, a loss.	249.5	2.2
<b><i>COLAs.</i></b>	18.0	0.2
<b><u>Other:</u></b>		
Service credit reinstatements, service transfers, service purchases, rehires, net of contributions.	(22.4)	(0.2)
Larger than expected average compensation for new retirees.	(9.2)	(0.1)
Change in group size, data adjustments, retroactive benefit payments, option elections, and miscellaneous unidentified changes in the UAAL.	(36.7)	(0.4)
<b><i>Experience Gain or (Loss) During Year</i></b>	<b>\$ 231.8</b>	<b>2.1 %</b>

\* Beginning of year accrued liabilities totaled \$11,135 million.

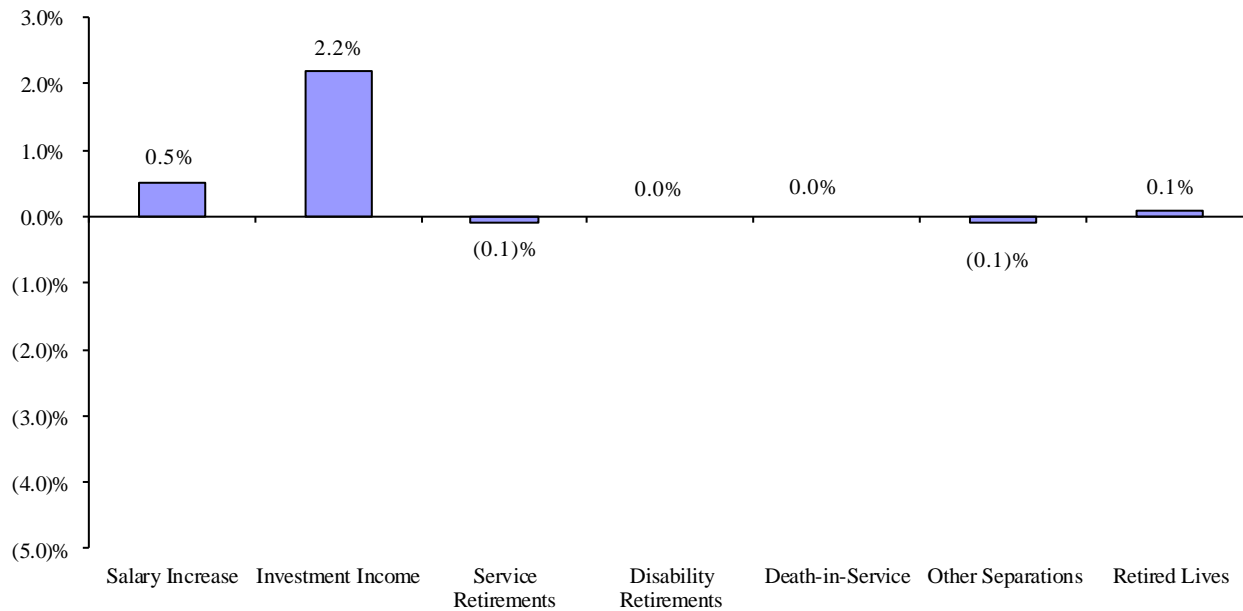
### Gain (Loss) Analysis 2013-2014 Experience

Amount in \$ Millions



Type of Risk Area

% of Actuarial Accrued Liabilities



Type of Risk Area

**Experience Gains & Losses by Risk Area**  
**Comparative Statement**  
**-----\$ in Millions-----**

Year Ending June 30	Gain (Loss) By Risk Area									Total Exper. Gain (Loss)	Exper. Gain (Loss) as % of AAL	Accrued Liability Beginning of Year
	Salary Increases	Investments	Age & Service Retirement	Disability	Death- In- Service	Withdrawal	Retired Lives &	COLAs	Other			
1992 *	\$ 79.8	\$ 19.9	\$ (1.8)	\$0.6	\$ 1.6	\$ (5.5)	#		\$ (8.0)	\$ 86.6	4.0 %	\$ 2,165
1993	66.8	54.0	(0.9)	0.8	2.4	(3.9)	#		(27.0)	92.2	4.0	2,292
1994	42.5	(18.1)	(1.0)	0.7	2.3	(7.0)	#		52.0	71.4	2.9	2,447
1995	16.7	12.0	(3.2)	0.5	2.5	(4.0)	#		(7.5)	17.0	0.6	2,919
1996	24.2	63.7	(2.1)	0.6	2.9	(10.2)	\$ 7.4		(74.3) ^	12.2	0.4	3,151
1997 *	(26.3)	260.3	(3.1)	0.5	2.6	(7.1)	14.5		(50.6)	190.8	5.5	3,440
1998	(56.9)	325.9	9.6	0.2	(0.3)	(1.7)	16.3		(48.3)	244.8	5.5	4,484
1999	(21.9)	299.8	(1.3)	(0.3)	(0.9)	1.7	10.5		(58.1)	229.5	4.7	4,919
2000 *	(6.4)	162.0	1.7	(0.5)	(0.7)	8.9	18.5		(34.7)	148.8	2.7	5,506
2001 *	(23.2)	(67.9)	(59.8)	(1.0)	(0.2)	(28.2)	(13.1)		(66.1)	(259.5)	(4.4)	5,921
2002	115.0	(284.6)	(14.4)	(0.5)	(1.3)	(21.4)	37.1		(62.6)	(232.8)	(3.8)	6,065
2003	7.7	(314.1)	(27.2)	(0.6)	(2.6)	(14.6)	9.6		(63.1)	(404.9)	(6.5)	6,294
2004 *	(40.0)	(240.1)	(51.5)	(1.4)	(1.3)	(6.7)	(4.3)		(53.8)	(399.1)	(6.0)	6,662
2005	(3.4)	(196.6)	3.1	(2.0)	(1.7)	(0.9)	(11.7)		(35.5)	(248.7)	(3.4)	7,230
2006	(29.5)	38.0	(1.7)	(2.3)	(2.4)	15.5	(21.1)		(3.6)	(7.1)	(0.1)	7,578
2007	(11.5)	179.4	(17.3)	(2.1)	(2.4)	3.8	(29.7)		(43.0)	77.2	1.0	8,013
2008 *	(10.5)	78.3	(22.9)	(2.0)	(3.4)	6.6	8.7		(49.8)	5.0	0.1	8,500
2009 *	(15.9)	(354.3)	8.8	(1.5)	0.0	(31.3)	(39.8)		(37.6)	(471.6)	(5.2)	9,128
2010	23.2	(313.6)	(19.0)	8.4	8.0	(30.6)	4.7		(56.9)	(375.8)	(3.9)	9,495
2011	49.6	(204.0)	(52.8)	10.8	7.5	(21.0)	32.7		(60.4)	(237.6)	(2.4)	9,853
2012 *	12.3	(447.2)	(24.3)	8.3	8.9	8.1	10.3		(53.6)	(477.2)	(4.7)	10,124
2013 **	60.4	(313.7)	6.7	11.1	7.4	2.0	(7.7)	(3.1)	(70.4)	(307.3)	(2.8)	10,794
<b>2014</b>	<b>52.6</b>	<b>249.5</b>	<b>(6.9)</b>	<b>(4.2)</b>	<b>(2.5)</b>	<b>(12.7)</b>	<b>6.3</b>	<b>18.0</b>	<b>(68.3)</b>	<b>231.8</b>	<b>2.1</b>	<b>11,135</b>

\* Revision in assumptions.

\*\* Revision in asset valuation method.

# Not identified as separate risk area. Included in "Other" category.

^ Includes (\$23.0) for legal settlement.

& Prior to the 2013 valuation, this amount included COLAs.

**Development of Gain (Loss)  
from Investment Income  
During Plan Year 2013 - 2014**

	Market Value	Actuarial Value
	----- \$ in millions -----	
1. Assets at June 30, 2013	\$7,993.8	\$ 8,096.4
2. Contributions and Transfers In	345.6	345.6
3. Investment Income	1,485.2	883.6
4. Benefit Payments	680.4	680.4
5. Administrative Expenses	7.4	7.4
6. Assets at June 30, 2014 = (1) + (2) + (3) – (4) – (5)	9,136.8	8,637.8
7. Actual Investment Increment/Mean Assets*	18.99 %	11.15 %
8. Expected Investment Increment		8.0 %
9. Investment Gain (Loss):		
a. As a % of mean assets: (7) – (8)		3.15 %
b. \$ in millions		<u>\$ 249.5</u>

\* Based on the approximation formula:  $I/[.5 \times (A+B-I)]$ , where

I = Investment increment  
A = Beginning of year asset value  
B = End of year asset value

**Salary Increases**  
**to Members Active Both at Beginning & End of Year**  
**During Plan Year 2013 - 2014**

Age Groups		Salary Increases	
		Actual*	Expected
Below 20			
20-24	835	8.5%	6.3%
25-29	3,164	5.2%	5.6%
30-34	4,382	4.3%	4.9%
35-39	4,677	3.6%	4.4%
40-44	5,658	2.9%	4.1%
45-49	6,294	2.7%	3.8%
50-54	7,402	2.5%	3.6%
55-59	6,569	2.3%	3.5%
60-64	4,213	2.2%	3.4%
65 & Over	1,572	1.9%	3.3%
<b>Total</b>	<b>44,766</b>		
<b>Average</b>		<b>3.0%</b>	<b>4.0%</b>

\* Excludes new entrants and terminations.

Assumed Payroll Growth**	Actual Payroll Growth		
	2014	2013	2012
3.0%	1.2%	0.9%	(0.6)%

\*\* Prior to 2012, assumed payroll growth was 4.0%.



**Active Members Who Retired With  
SERVICE OR REDUCED SERVICE RETIREMENT BENEFITS  
During Plan Year 2013 - 2014**

Ages	Men		Women		Total	
	Actual	Expected	Actual	Expected	Actual	Expected
Under 50	3	0.5	11	1.5	14	2.1
50	1	3.2	12	13.0	13	16.1
51	6	7.2	20	16.4	26	23.6
52	16	12.2	29	34.8	45	47.1
53	11	17.3	22	28.9	33	46.2
54	15	19.6	38	38.7	53	58.3
55	22	30.4	57	52.8	79	83.2
56	26	28.8	44	54.3	70	83.0
57	31	44.2	46	59.7	77	103.9
58	27	45.3	59	70.8	86	116.1
59	26	45.2	62	62.4	88	107.7
60	33	46.5	67	71.2	100	117.7
61	43	49.9	61	62.8	104	112.7
62	85	95.6	97	123.1	182	218.7
63	52	60.8	85	93.4	137	154.3
64	32	46.0	70	70.3	102	116.2
65	51	60.6	80	79.0	131	139.6
66	57	43.8	66	55.8	123	99.5
67	39	34.4	52	39.2	91	73.6
68	16	19.3	13	18.8	29	38.2
69	19	13.4	15	13.4	34	26.8
70 & Over	49	66.4	51	53.7	100	120.0
<b>Totals</b>	<b>660</b>	<b>790.4</b>	<b>1,057</b>	<b>1,114.2</b>	<b>1,717</b>	<b>1,904.6</b>

	Men	Women	Total
Average age at retirement	62.7 years	61.4 years	61.9 years
Average service at retirement	20.5 years	22.3 years	21.6 years

**Active Members Who Retired with DISABILITY BENEFITS  
During Plan Year 2013 - 2014**

Ages	Men		Women		Total	
	Actual	Expected	Actual	Expected	Actual	Expected
Under 25	1	0.8		2.1	1	2.9
25-29		2.8	2	6.9	2	9.7
30-34	3	3.9	3	9.1	6	13.0
35-39	2	4.6	8	9.5	10	14.1
40-44	9	6.9	6	13.2	15	20.1
45-49	10	10.0	20	19.7	30	29.7
50-54	13	17.9	33	29.4	46	47.3
55-59	15	25.0	22	34.4	37	59.4
60 & Over	9	12.5	5	17.1	14	29.6
<b>Totals</b>	<b>62</b>	<b>84.3</b>	<b>99</b>	<b>141.6</b>	<b>161</b>	<b>225.9</b>

	Men	Women	Total
Average age at disability	51.0 years	50.4 years	50.6 years
Average service at disability	10.2 years	10.8 years	10.6 years

### Active Members Who Died During Plan Year 2013 - 2014

Ages	Men		Women		Total	
	Actual	Expected	Actual	Expected	Actual	Expected
Under 30	-	0.1	-	0.1	-	0.2
30-34	2	0.4	-	0.3	2	0.8
35-39	1	0.8	-	0.6	1	1.4
40-44	3	1.3	1	1.2	4	2.5
45-49	9	2.0	5	2.0	14	4.0
50-54	11	3.6	4	4.0	15	7.5
55-59	6	6.3	6	7.0	12	13.3
60-64	9	8.7	2	9.0	11	17.6
65 & Over	5	9.0	2	6.9	7	15.9
<b>Totals</b>	<b>46</b>	<b>32.3</b>	<b>20</b>	<b>31.0</b>	<b>66</b>	<b>63.3</b>

	Men	Women	Total
Average age at death	54.6 years	54.7 years	54.6 years
Average service at death	14.0 years	13.7 years	13.9 years

**Of the 66 active members who died in service during plan year 2013-2014, 31 members had a benefit payable to a survivor.**

**Active Members Who Left Active Status with a DEFERRED BENEFIT  
(Retirement with Monthly Payments Beginning at Later Age)  
During Plan Year 2013 - 2014**

Ages	Men		Women		Total	
	Actual	Expected	Actual	Expected	Actual	Expected
Under 30	41	45.4	66	65.8	107	111.2
30-34	109	109.3	172	171.8	281	281.1
35-39	86	102.9	151	170.0	237	272.9
40-44	74	92.9	150	160.9	224	253.8
45-49	80	79.4	141	134.5	221	213.9
50-54	79	67.8	123	107.8	202	175.7
55-59	40	50.8	58	80.8	98	131.6
60 & Over	15	15.2	18	22.9	33	38.1
<b>Totals</b>	<b>524</b>	<b>563.8</b>	<b>879</b>	<b>914.5</b>	<b>1,403</b>	<b>1,478.3</b>

	Men	Women	Total
Average age at termination	42.4 years	42.4 years	42.4 years
Average service at termination	9.5 years	9.7 years	9.6 years

**Active Members Who Left Active Status with NO BENEFIT PAYABLE  
(Other than Deaths)  
During Plan Year 2013 - 2014**

Ages	Men		Women		Total	
	Actual	Expected	Actual	Expected	Actual	Expected
Under 20						
20-24	144	92.3	226	146.8	370	239.1
25-29	299	220.7	422	327.0	721	547.7
30-34	200	152.1	273	219.9	473	372.0
35-39	121	98.3	173	147.8	294	246.1
40-44	95	81.8	152	138.9	247	220.7
45-49	77	71.2	139	130.8	216	202.1
50-54	52	61.7	107	125.6	159	187.3
55-59	57	55.2	85	93.7	142	149.0
60-64	30	39.0	41	50.3	71	89.3
65-69	10	14.3	11	12.0	21	26.4
70 & Over	3	4.6	3	2.7	6	7.4
<b>Totals</b>	<b>1,088</b>	<b>891.4</b>	<b>1,632</b>	<b>1,395.6</b>	<b>2,720</b>	<b>2,286.9</b>

	Men	Women	Total
Average age at termination	35.4 years	35.8 years	35.7 years
Average service at termination	1.7 years	1.7 years	1.7 years

Service at Termination	Men		Women		Total	
	Actual	Expected	Actual	Expected	Actual	Expected
0	444	367.9	655	617.4	1,099	985.3
1	300	250.3	451	421.5	751	671.8
2	138	156.2	244	218.5	382	374.7
3	105	100.3	129	123.2	234	223.5
4	101	16.7	153	14.9	254	31.6
5 & Over	-	-	-	-	-	-
<b>Totals</b>	<b>1,088</b>	<b>891.4</b>	<b>1,632</b>	<b>1,395.6</b>	<b>2,720</b>	<b>2,286.9</b>

**Comparison of Actual to Expected Deaths  
Among Retired Lives  
(Service Retirement Only)  
As of June 30, 2014**

Age	Male Deaths			Female Deaths			Total Deaths		
	Actual	Expected	Exposure	Actual	Expected	Exposure	Actual	Expected	Exposure
45-49			2			7			9
50-54	1		180	2		485	3		665
55-59	17	5	1,454	21	9	2,584	38	14	4,038
60-64	41	25	3,379	48	33	5,139	89	58	8,518
65-69	62	43	3,431	68	54	4,834	130	97	8,265
70-74	46	47	2,225	54	61	3,258	100	108	5,483
75-79	66	51	1,342	69	66	2,151	135	117	3,493
80-84	67	58	854	76	69	1,391	143	127	2,245
85-89	36	49	419	106	82	937	142	131	1,356
90-94	20	22	119	49	49	323	69	71	442
95-99	6	6	19	21	18	91	27	24	110
100 & Up		1	3	2	2	10	2	3	13
<b>Totals</b>	<b>362</b>	<b>307</b>	<b>13,425</b>	<b>516</b>	<b>443</b>	<b>21,203</b>	<b>878</b>	<b>750</b>	<b>34,628</b>
<b>Average Ages</b>	<b>75.1</b>	<b>77.3</b>	<b>68.1</b>	<b>78.0</b>	<b>78.8</b>	<b>68.4</b>	<b>76.8</b>	<b>78.2</b>	<b>68.3</b>

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SECTION C  
FUND ASSETS

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## Development of Actuarial Value of Assets New Method

Valuation Date: June 30	2013	2014
<b>A. Actuarial value at beginning of year</b>	\$ 7,897,167,203	\$ 8,096,436,929
<b>B. Market value at end of year</b>	7,993,837,570	9,136,781,826
<b>C. Market value at beginning of year</b>	7,581,882,309	7,993,837,570
<b>D. Cash flow</b>		
D1. Contributions	290,275,917	345,557,293
D2. Benefit payments	(649,242,314)	(680,436,106)
D3. Administrative expenses	(7,575,883)	(7,336,922)
D4. Net	(366,542,280)	(342,215,735)
<b>E. Investment income</b>		
E1. Market total (B-C-D4)	778,497,541	1,485,159,991
E2. Assumed rate	8.00%	8.00%
E3. Amount for immediate recognition $(A + .5 * D4) * E2$	617,111,685	634,026,325
E4. Amount for phased-in recognition $(E1 - E3)$	161,385,856	851,133,666
<b>F. Unrecognized gains/(losses) from prior years</b>	(315,284,894)	(102,599,359)
<b>G. Phased-in recognition of investment income <math>(E4 + F) / 3</math></b>	(51,299,679)	249,511,436
<b>H. End of year adjustment</b>	-	-
<b>I. Actuarial value at end of year</b>		
I1. Preliminary Value $(A + D4 + E3 + F + G + H)$	8,096,436,929	8,637,758,955
I2. Upper Corridor Limit: $125\% \times B$	9,992,296,963	11,420,977,283
I3. Lower Corridor Limit: $80\% \times B$	6,395,070,056	7,309,425,461
I4. Corridor Adjustment	-	-
I5. Funding Value End of Year: $I1 + I4$	8,096,436,929	8,637,758,955
<b>J. Difference between market and actuarial values <math>(B - I5)</math></b>	(102,599,359)	499,022,871
<b>K. Recognized rate of return</b>	7.33%	11.15%
<b>L. Market value rate of return</b>	10.52%	18.99%
<b>M. Actuarial value as a % of market value: <math>I5 / B</math></b>	101%	95%

The actuarial value of assets recognizes assumed investment income (line E3) fully each year. Differences between actual and assumed investment income (line E4) are phased-in over an open 3-year period. During periods when investment performance exceeds the assumed rate, the actuarial value of assets will tend to be less than market value. During periods when investment performance is less than assumed, the actuarial value will tend to be greater than market value.



## Asset Summary

**June 30, 2014**

	<b>Market Value</b>	<b>Actuarial Value</b>
1. Assets at June 30, 2013	\$7,993,837,570	\$8,096,436,929
2. Contributions and Transfers In	345,557,293	345,557,293
3. Investment Increment*	1,485,159,991	883,537,761
4. Benefit Payments and Transfers Out	680,436,106	680,436,106
5. Administrative and Misc. Expenses	7,336,922	7,336,922
6. Assets at June 30, 2014 (1) + (2) + (3) - (4) - (5)	\$9,136,781,826	\$8,637,758,955
7. Investment Increment/Mean Assets**	18.99%	11.15%

\* *Net of investment expenses.*

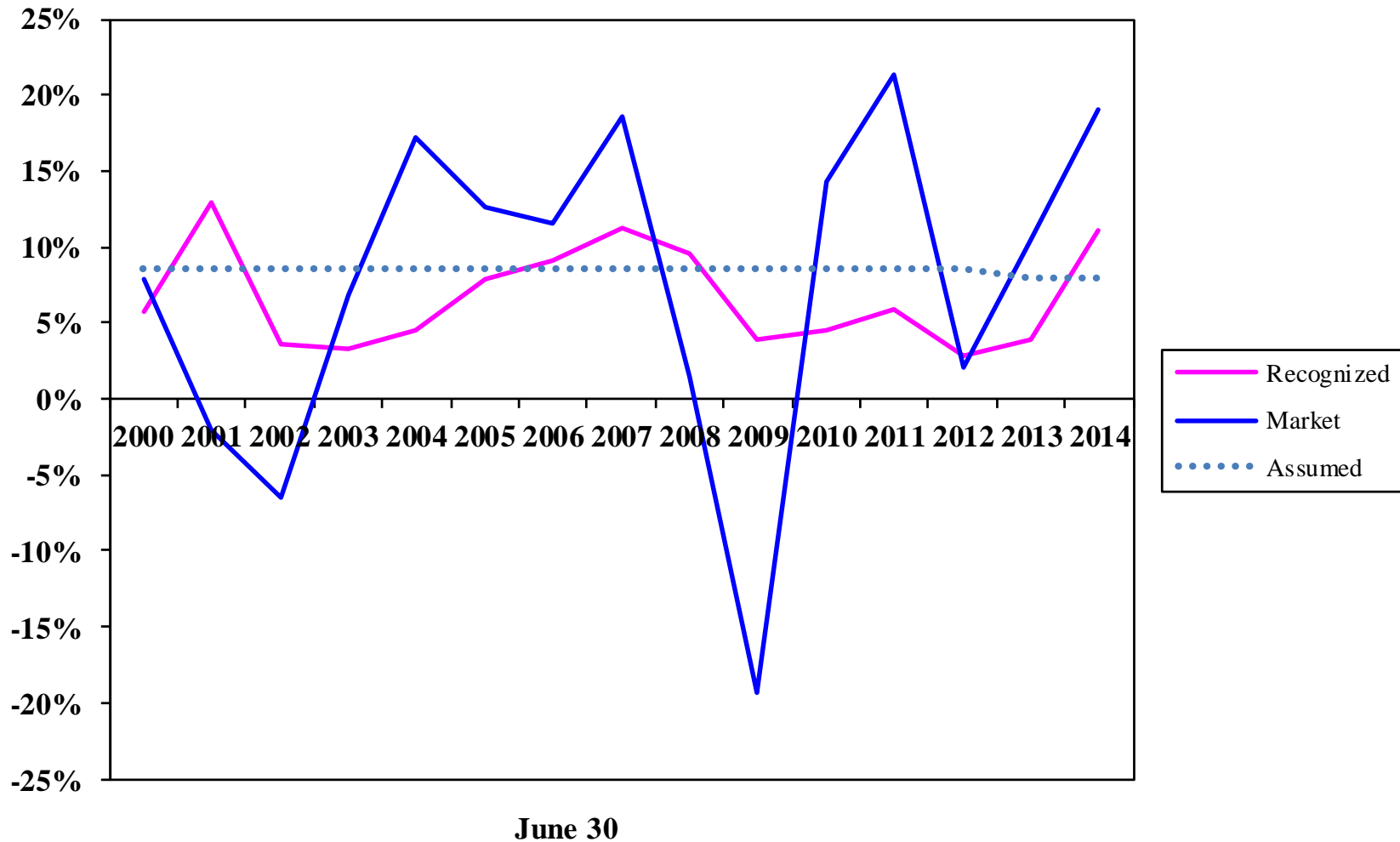
\*\* *Based on the approximation formula:  $I / [.5 \times (A+B-I)]$ , where*

I = Investment Increment

A = Beginning of year asset value

B = End of year asset value

### Recognized vs. Market Returns



The period of asset smoothing was changed from 3 to 5 years effective June 30, 2001.  
 The asset smoothing method was changed from 5-year smoothing to 3-year rolling smoothing effective June 30, 2013.

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SECTION D  
PROJECTIONS

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## The Nature of Actuarial Projections

Regular actuarial valuations measure the Retirement System's present financial position and contributions adequacy by calculating and financing the liabilities created by the present benefit program. This process involves discounting to present values the future benefit payments on behalf of present active and retired members and their survivors. However, valuations do not produce information regarding future changes in the makeup of the covered group or the amounts of benefits to be paid or investment income to be received-actuarial projections do.

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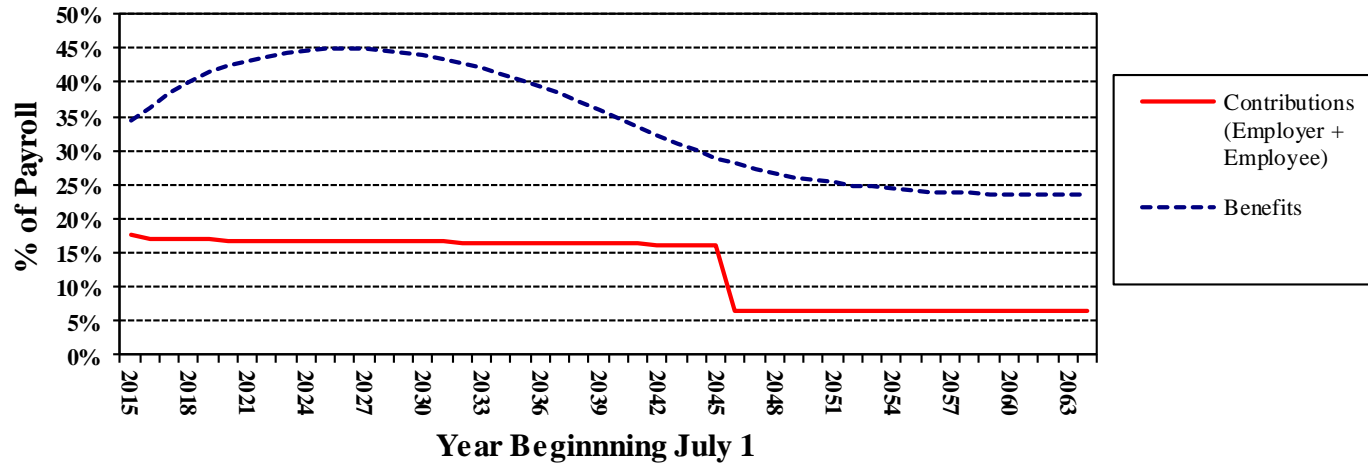
Whereas valuations provide a snapshot of the Retirement System as of a given date, projections provide a moving picture. Projected active and retired groups are developed from year to year by the application of assumptions regarding pre-retirement withdrawal from service, retirements, deaths, disabilities, and the addition of new members. Projected information regarding the retired life group leads to assumed future benefit payout. Combining future benefit payments with assumed contributions and expected investment earnings produces the net cash flow of the System each year, and thus end of year asset levels.

Projections are used for many purposes. Among them are (i) developing cash flow patterns for investment policy and asset mix consideration, (ii) exploring the effect of alternative assumptions about future experience, (iii) analyzing the impact on System funding progress of changes in the workforce, and (iv) examining the potential effect of changes in benefits on system financial activity.

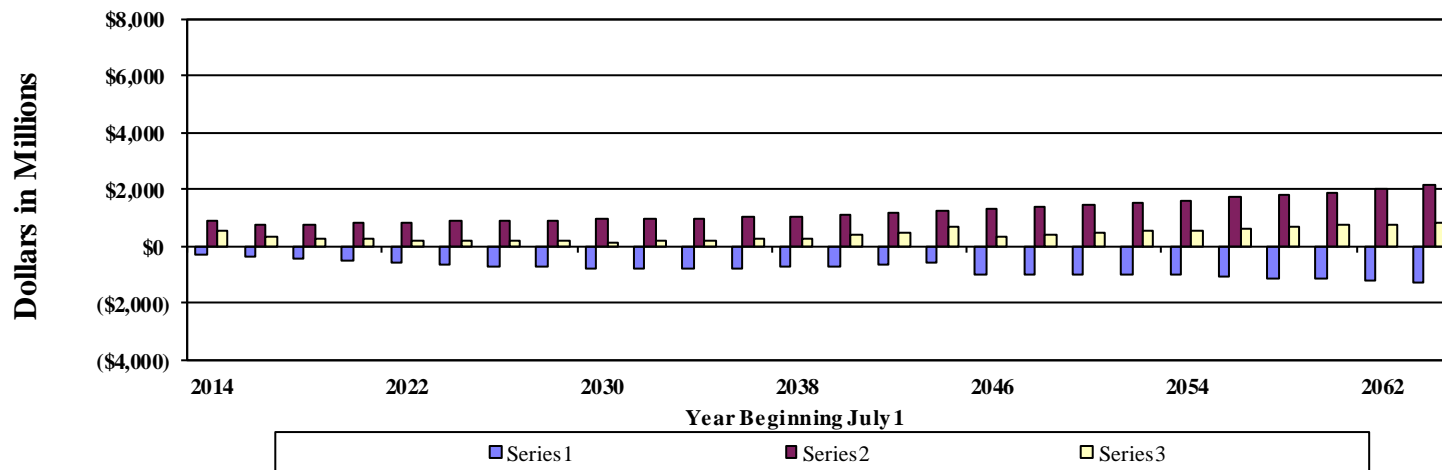
Projection results are useful in demonstrating changing relationships among key elements affecting system financial activity. For example: how benefits payable and System assets will grow in future decades. Projections are not predictions of specific future events and do not provide numeric precision in absolute terms. For instance, cash flow projected to occur 10 years in the future will not be exact (except by coincidence), but understanding the changed relationships between future benefit payout and future investment income can be very useful.

## 50-Year Cash Flow Projection Based on Valuation Assumptions

### Projected Contributions\* and Benefits Expressed as Percents of Active Member Payroll



### Net Change in Asset Values



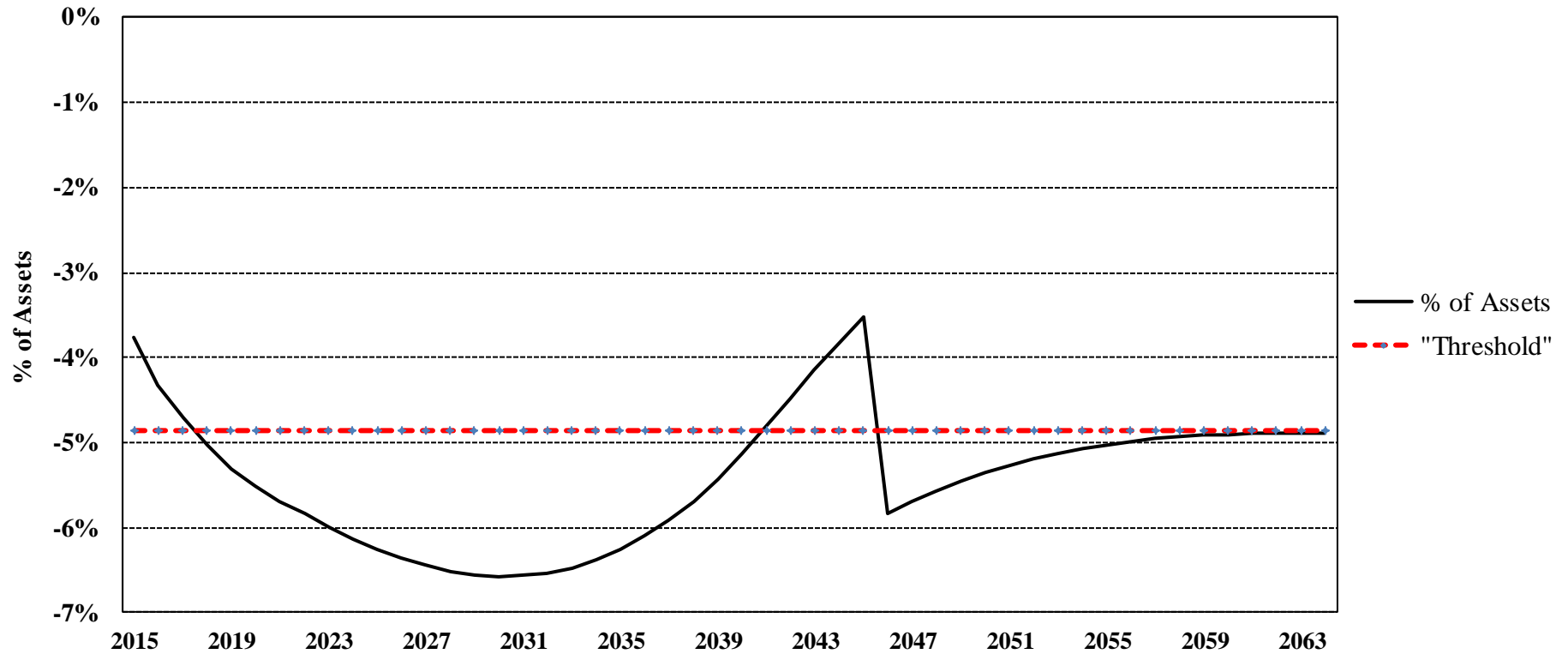
\* Does not include contributions for administrative expenses. Includes member contributions.

### Fifty-Year Cash Flow Projection (in Thousands)

Year Ended June 30	Assets BOY	Contributions*			Benefits	Investment Income	Assets EOY	
		Normal	UAAL	Total			Inflated	2015 \$
2015	\$ 8,637,759	\$ 155,216	\$ 192,257	\$ 347,473	\$ 672,608	\$ 678,182	\$ 8,990,806	\$8,990,806
2016	8,990,806	156,545	180,905	337,450	726,319	703,909	9,305,846	9,034,802
2017	9,305,846	157,488	186,826	344,314	782,630	727,161	9,594,691	9,043,916
2018	9,594,691	158,749	192,663	351,412	834,296	748,507	9,860,314	9,023,584
2019	9,860,314	160,404	198,696	359,100	882,072	768,174	10,105,516	8,978,620
2020	10,105,516	162,220	204,898	367,118	925,136	786,408	10,333,906	8,914,118
2021	10,333,906	164,600	211,215	375,815	963,807	803,494	10,549,408	8,834,963
2022	10,549,408	166,888	217,640	384,528	1,000,951	819,611	10,752,596	8,742,845
2023	10,752,596	169,775	224,178	393,953	1,038,187	834,770	10,943,132	8,638,609
2024	10,943,132	172,567	231,052	403,619	1,074,767	848,950	11,120,934	8,523,270
2025	11,120,934	175,741	238,276	414,017	1,109,942	862,195	11,287,204	8,398,740
2026	11,287,204	179,302	245,334	424,636	1,142,772	874,619	11,443,687	8,267,163
2027	11,443,687	183,008	252,974	435,982	1,173,037	886,391	11,593,023	8,131,113
2028	11,593,023	186,879	260,449	447,328	1,202,287	897,632	11,735,696	7,991,438
2029	11,735,696	191,167	268,241	459,408	1,228,358	908,492	11,875,238	7,850,931
2030	11,875,238	195,625	276,378	472,003	1,252,659	919,193	12,013,775	7,711,185
2031	12,013,775	200,242	284,847	485,089	1,274,115	929,947	12,154,696	7,574,404
2032	12,154,696	205,317	293,052	498,369	1,293,217	940,989	12,300,837	7,442,209
2033	12,300,837	210,559	301,864	512,423	1,309,329	952,600	12,456,531	7,316,899
2034	12,456,531	215,983	311,016	526,999	1,322,233	965,121	12,626,418	7,200,670
2035	12,626,418	221,576	320,165	541,741	1,332,278	978,898	12,814,779	7,095,232
2036	12,814,779	227,675	329,619	557,294	1,339,338	994,300	13,027,035	7,002,673
2037	13,027,035	233,995	339,433	573,428	1,344,163	1,011,729	13,268,029	6,924,485
2038	13,268,029	240,508	349,567	590,075	1,345,149	1,031,627	13,544,582	6,862,928
2039	13,544,582	247,627	359,710	607,337	1,342,794	1,054,525	13,863,650	6,819,997
2040	13,863,650	254,597	370,567	625,164	1,337,092	1,080,980	14,232,702	6,797,618
2041	14,232,702	262,185	381,396	643,581	1,328,473	1,111,573	14,659,383	6,797,479
2042	14,659,383	270,007	392,143	662,150	1,318,608	1,146,829	15,149,754	6,820,254
2043	15,149,754	278,045	403,587	681,632	1,309,281	1,187,196	15,709,301	6,866,170
2044	15,709,301	286,282	415,304	701,586	1,301,561	1,233,053	16,342,379	6,934,829
2045	16,342,379	294,703	426,379	721,082	1,297,386	1,284,633	17,050,708	7,024,666
2046	17,050,708	303,759	0	303,759	1,297,270	1,324,826	17,382,023	6,952,586
2047	17,382,023	312,541	0	312,541	1,301,234	1,351,521	17,744,851	6,890,983
2048	17,744,851	321,995	0	321,995	1,309,433	1,380,597	18,138,010	6,838,506
2049	18,138,010	331,684	0	331,684	1,321,097	1,411,972	18,560,569	6,794,002
2050	18,560,569	341,617	0	341,617	1,336,171	1,445,574	19,011,589	6,756,403
2051	19,011,589	351,817	0	351,817	1,354,218	1,481,345	19,490,533	6,724,866
2052	19,490,533	362,302	0	362,302	1,375,122	1,519,249	19,996,962	6,698,641
2053	19,996,962	373,088	0	373,088	1,399,045	1,559,246	20,530,251	6,676,974
2054	20,530,251	384,192	0	384,192	1,425,930	1,601,285	21,089,798	6,659,178
2055	21,089,798	395,625	0	395,625	1,455,813	1,645,320	21,674,930	6,644,598
2056	21,674,930	407,401	0	407,401	1,488,686	1,691,299	22,284,944	6,632,623
2057	22,284,944	419,532	0	419,532	1,524,496	1,739,163	22,919,143	6,622,698
2058	22,919,143	432,030	0	432,030	1,563,106	1,788,869	23,576,936	6,614,343
2059	23,576,936	445,584	0	445,584	1,604,273	1,840,401	24,258,648	6,607,371
2060	24,258,648	458,872	0	458,872	1,647,895	1,893,741	24,963,366	6,601,278
2061	24,963,366	472,566	0	472,566	1,693,906	1,948,843	25,690,869	6,595,784
2062	25,690,869	486,677	0	486,677	1,742,090	2,005,697	26,441,153	6,590,689
2063	26,441,153	501,219	0	501,219	1,792,362	2,064,309	27,214,319	6,585,832
2064	27,214,319	516,205	0	516,205	1,844,621	2,124,690	28,010,593	6,581,097

\* Does not include contributions for administrative expenses. Includes member contributions.

### 50-Year Cash Flow Projection Projected Net External Cash Flow Expressed as a Percent of Assets



**Net External Cash Flow** equals: i) Contributions to the plan, less ii) Benefits paid by the plan. A negative Net External Cash Flow means that benefits are being partly funded by investment income --- a natural consequence of advance funding.

**Fifty-Year Cash Flow Projection**  
**Analysis of Projected Net Cash Flow (In Thousands)**

Year Ended June 30	External Cash Flow		Net External Cash Flow		Year Ended June 30	External Cash Flow		Net External Cash Flow	
	Inflow*	Outflow	\$	% of Assets		Inflow*	Outflow	\$	% of Assets
2015	\$ 347,473	\$ 672,608	\$ (325,135)	(3.76)%	2040	\$ 625,164	\$ 1,337,092	\$ (711,928)	(5.14)%
2016	337,450	726,319	(388,869)	(4.33)%	2041	643,582	1,328,473	(684,891)	(4.81)%
2017	344,314	782,630	(438,316)	(4.71)%	2042	662,150	1,318,608	(656,458)	(4.48)%
2018	351,412	834,296	(482,885)	(5.03)%	2043	681,632	1,309,281	(627,650)	(4.14)%
2019	359,100	882,072	(522,972)	(5.30)%	2044	701,586	1,301,561	(599,976)	(3.82)%
2020	367,118	925,136	(558,017)	(5.52)%	2045	721,082	1,297,386	(576,304)	(3.53)%
2021	375,815	963,807	(587,992)	(5.69)%	2046	303,759	1,297,270	(993,511)	(5.83)%
2022	384,527	1,000,951	(616,424)	(5.84)%	2047	312,541	1,301,234	(988,693)	(5.69)%
2023	393,953	1,038,187	(644,233)	(5.99)%	2048	321,995	1,309,433	(987,438)	(5.56)%
2024	403,620	1,074,767	(671,147)	(6.13)%	2049	331,684	1,321,097	(989,413)	(5.45)%
2025	414,017	1,109,942	(695,925)	(6.26)%	2050	341,617	1,336,171	(994,554)	(5.36)%
2026	424,636	1,142,772	(718,136)	(6.36)%	2051	351,817	1,354,218	(1,002,401)	(5.27)%
2027	435,982	1,173,037	(737,055)	(6.44)%	2052	362,302	1,375,122	(1,012,820)	(5.20)%
2028	447,328	1,202,287	(754,958)	(6.51)%	2053	373,088	1,399,045	(1,025,957)	(5.13)%
2029	459,408	1,228,358	(768,950)	(6.55)%	2054	384,192	1,425,930	(1,041,738)	(5.07)%
2030	472,003	1,252,659	(780,656)	(6.57)%	2055	395,625	1,455,813	(1,060,187)	(5.03)%
2031	485,090	1,274,115	(789,026)	(6.57)%	2056	407,401	1,488,686	(1,081,285)	(4.99)%
2032	498,369	1,293,217	(794,848)	(6.54)%	2057	419,532	1,524,496	(1,104,964)	(4.96)%
2033	512,423	1,309,329	(796,906)	(6.48)%	2058	432,030	1,563,106	(1,131,076)	(4.94)%
2034	526,999	1,322,233	(795,234)	(6.38)%	2059	445,584	1,604,273	(1,158,689)	(4.91)%
2035	541,741	1,332,278	(790,537)	(6.26)%	2060	458,872	1,647,895	(1,189,023)	(4.90)%
2036	557,293	1,339,338	(782,045)	(6.10)%	2061	472,566	1,693,906	(1,221,340)	(4.89)%
2037	573,428	1,344,163	(770,736)	(5.92)%	2062	486,677	1,742,090	(1,255,413)	(4.89)%
2038	590,075	1,345,149	(755,074)	(5.69)%	2063	501,219	1,792,362	(1,291,143)	(4.88)%
2039	607,337	1,342,794	(735,457)	(5.43)%	2064	516,205	1,844,621	(1,328,416)	(4.88)%

\* Does not include contributions for administrative expenses.

The portion of investment income needed to pay benefits (the negative external cash flow) increases gradually and begins to level off at the end of the amortization of the unfunded accrued liabilities. After this period, it then approaches the assumed rate of 4.85% (1.08/1.03, minus 1). The remainder of the expected investment income is needed to preserve the purchasing power of the trust fund.



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SECTION E  
PARTICIPANT DATA

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**Retirants & Beneficiaries as of June 30, 2014  
Tabulated by Plan Year of Retirement**

<b>Calendar Year Ended Dec 31 2008</b>	<b>No.</b>	<b>Total Annual Benefits</b>	<b>Average Monthly Benefit</b>
2014 *	1,223	\$ 16,252,986	\$1,107
2013	2,960	39,889,641	1,123
2012	2,968	40,662,102	1,142
2011	2,766	38,518,915	1,160
2010	2,860	43,145,830	1,257
2009	2,303	33,401,128	1,209
2008	2,264	32,770,940	1,206
2007	2,143	30,303,204	1,178
2006	2,046	29,954,302	1,220
2005	1,843	27,405,413	1,239
2004	1,348	19,398,312	1,199
2003	2,546	41,686,344	1,364
2002	1,820	29,076,277	1,331
2001	1,555	26,138,439	1,401
2000	2,022	35,527,763	1,464
1999	1,080	18,715,409	1,444
1998	1,005	18,653,978	1,547
1997	880	15,664,532	1,483
1996	745	12,432,652	1,391
1995	789	13,910,499	1,469
1994	544	8,494,466	1,301
1993	577	9,617,787	1,389
1992	473	7,266,955	1,280
1991	450	7,452,701	1,380
1990	298	4,683,234	1,310
1989	296	4,394,995	1,237
1988	283	4,114,465	1,212
1987	208	2,357,271	944
1986	179	1,868,066	870
1985	123	1,187,535	805
1984	90	987,270	914
1983	74	792,831	893
1982	67	615,912	766
1981	57	486,318	711
1980	31	348,494	937
1979	21	122,098	485
1978	16	107,429	560
1977	20	150,360	627
1976	14	101,436	604
1975	5	19,980	333
1974	5	34,848	581
1973 & PRIOR	3	17,399	483
<b>Totals</b>	<b>41,000</b>	<b>\$618,730,516</b>	<b>\$1,258</b>

\* Five months ended May 31, 2014.

**Benefits Payable June 30, 2014  
Tabulated by Option and Type of Benefit**

**MSEP Benefits**

Type of Benefit	No.	Annual Benefits
Service Retirement		
Life Annuity	5,237	\$ 69,831,408
50% Joint and Survivor	5,404	92,547,248
75% Joint and Survivor	0	0
100% Joint and Survivor	2,819	55,975,226
5-Year Certain and Life	139	1,470,096
10-Year Certain and Life	154	1,672,987
Survivor Beneficiary	2,382	28,475,213
Total	<u>16,135</u>	<u>249,972,178</u>
Disability Retirement	5	19,560
Death-in-Service	1,438	15,805,454
<b>Total</b>	<b>17,578</b>	<b>\$ 265,797,192</b>

**MSEP 2000 Benefits**

Type of Benefit	No.	Annual Benefits
Service Retirement		
Life Annuity	14,192	\$ 203,446,520
50% Joint and Survivor	3,450	68,764,933
100% Joint and Survivor	3,813	62,387,488
5-Year Certain and Life	29	406,820
10-Year Certain and Life	627	6,746,898
15-Year Certain and Life	504	4,427,082
Survivor Beneficiary	677	6,290,411
Total	<u>23,292</u>	<u>352,470,152</u>
Disability Retirement	0	0
Death-in-Service	130	463,172
<b>Total</b>	<b>23,422</b>	<b>\$ 352,933,324</b>

**Total Benefits Payable June 30, 2014**  
**Tabulated by Attained Ages of Benefit Recipients**

Attained Ages	Service Retirement		Disability Retirement		Survivors and Beneficiaries		Totals	
	No.	Annual Benefits	No.	Annual Benefits	No.	Annual Benefits	No.	Annual Benefits
Under 20					77	\$ 262,666	77	\$ 262,666
20-24					19	135,018	19	135,018
25-29					8	29,976	8	29,976
30-34					23	145,076	23	145,076
35-39					41	314,287	41	314,287
40-44					78	528,588	78	528,588
45-49	3	\$ 73,716			121	1,009,719	124	1,083,435
50-54	494	14,483,410			187	1,483,425	681	15,966,835
55-59	3,532	74,709,608	1	\$ 2,148	335	3,378,888	3,868	78,090,644
60-64	8,278	126,912,002	3	12,192	513	5,492,540	8,794	132,416,734
65-69	9,401	124,156,823	1	5,220	603	7,060,062	10,005	131,222,105
70-74	6,157	89,585,446			616	8,001,291	6,773	97,586,737
75-79	3,861	65,459,043			667	8,441,460	4,528	73,900,503
80-84	2,472	41,805,065			649	7,753,980	3,121	49,559,045
85-89	1,465	22,113,938			468	4,662,270	1,933	26,776,208
90-94	542	6,482,589			174	1,780,512	716	8,263,101
95	55	694,646			10	175,898	65	870,544
96	33	437,939			14	186,012	47	623,951
97	23	272,953			7	81,000	30	353,953
98	17	177,550			8	42,642	25	220,192
99	11	104,136			7	62,952	18	167,088
100	10	112,948			1	2,400	11	115,348
101	5	27,734			1	3,588	6	31,322
102	6	40,884					6	40,884
103	2	19,532					2	19,532
104	1	6,744					1	6,744
<b>Totals</b>	<b>36,368</b>	<b>\$ 567,676,706</b>	<b>5</b>	<b>\$ 19,560</b>	<b>4,627</b>	<b>\$ 51,034,250</b>	<b>41,000</b>	<b>\$ 618,730,516</b>

Average age at Retirement: 60.2 years.

Average age now: 69.5 years.

## Summary of Member Data Included in Valuation

**June 30, 2014**

### Active Members

Valuation Group	Number	Payroll	Group Averages		
			Salary	Age(yrs.)	Service(yrs.)
Regular State Employees	47,600	\$ 1,730,725,210	\$ 36,360	45.4	11.0
Elected Officials	6	659,978	109,996	49.3	7.4
Legislative Clerks	20	687,905	34,395	59.7	21.5
Legislators	191	6,871,658	35,977	51.6	4.5
Uniformed Water Patrol	14	891,278	63,663	42.7	17.1
Conservation Department	1,382	60,168,509	43,537	44.9	14.5
School-Term Salaried Employees	1,381	99,917,999	72,352	56.8	21.0
Administrative Law Judges	27	2,797,391	103,607	56.9	20.4
<b>Total MOSERS*</b>	<b>50,621</b>	<b>\$ 1,902,719,928</b>	<b>\$ 37,588</b>	<b>45.7</b>	<b>11.3</b>
Judges*	405	\$ 49,587,936	\$ 122,439	57.1	12.7

The total number of MOSERS active members includes 38,493 MSEP/MSEP 2000 members and 12,128 MSEP 2011 members.

### Retired Lives

Type of Benefit Payment	No.	Annual Benefit	Group Averages	
			Benefit	Age(yrs.)
Retirement	36,368	\$ 567,676,706	\$ 15,609	69.4
Disability	5	19,560	3,912	61.8
Survivor of Active Member	1,568	16,268,626	10,375	62.0
Survivor of Retired Member	3,059	34,765,624	11,365	75.0
<b>Total MOSERS*</b>	<b>41,000</b>	<b>\$ 618,730,516</b>	<b>\$ 15,091</b>	<b>69.5</b>
Judges*	511	\$ 29,849,408	\$ 58,414	75.8

This valuation also includes 18,933 terminated vested members, 199 members on leave and 997 members on long-term disability.

\* Total covered by MOSERS excluding Judges. Judges assets, liabilities, contribution rates and other valuation results are included in a separate report covering only Judges.

**Active Members as of June 30, 2014**  
**By Age and Years of Service#\***

Near Age	Years of Service to Valuation Date							Totals	
	0-4	5-9	10-14	15-19	20-24	25-29	30 plus	No.	Valuation Payroll
15-19	25							25	\$ 610,207
20-24	1,551	10						1,561	41,503,475
25-29	3,599	655	5					4,259	130,818,824
30-34	2,669	2,010	507	10				5,196	175,271,645
35-39	1,790	1,578	1,433	463	11			5,275	189,090,092
40-44	1,573	1,339	1,358	1,506	344	19		6,139	229,549,327
45-49	1,371	1,186	1,179	1,345	1,105	457	28	6,671	259,667,755
50-54	1,327	1,258	1,286	1,348	1,037	1,136	459	7,851	313,424,713
55-59	1,018	1,129	1,225	1,289	962	813	609	7,045	282,776,035
60	164	200	194	209	157	137	77	1,138	46,920,269
61	144	176	196	218	144	110	74	1,062	43,747,035
62	116	170	201	212	123	90	98	1,010	41,684,599
63	110	134	158	144	94	67	85	792	32,980,322
64	67	118	131	119	95	72	59	661	27,767,902
65	56	105	112	100	93	40	53	559	24,912,000
66	40	73	76	62	38	34	38	361	15,541,258
67	29	56	71	48	30	23	30	287	13,390,922
68	22	40	45	41	22	19	27	216	9,747,650
69	9	21	29	29	14	11	15	128	6,213,487
70 & Over	36	60	82	72	42	31	62	385	17,102,411
<b>Totals</b>	<b>15,716</b>	<b>10,318</b>	<b>8,288</b>	<b>7,215</b>	<b>4,311</b>	<b>3,059</b>	<b>1,714</b>	<b>50,621</b>	<b>\$ 1,902,719,928</b>

While not used in the financial computations, the following group averages are computed and shown because of their general interest.

Age: 45.7 years

Service: 11.3 years

Annual Pay: \$37,588

# Includes 27 ALJ members.

\* A breakdown by gender is included on pages 46 and 47.

**Active Members as of June 30, 2014  
By Age and Years of Service**

**Male**

Near Age	Years of Service to Valuation Date							Totals	
	0-4	5-9	10-14	15-19	20-24	25-29	30 plus	No.	Valuation Payroll
Under 20	10							10	\$ 255,804
20-24	655	2						657	18,003,018
25-29	1,569	278	2					1,849	58,434,525
30-34	1,121	807	180	2				2,110	73,656,442
35-39	733	630	563	140	3			2,069	77,161,260
40-44	610	475	546	559	92	4		2,286	92,330,090
45-49	517	458	451	514	414	126	5	2,485	104,676,224
50-54	483	469	501	517	405	452	116	2,943	129,686,319
55-59	384	428	461	503	376	376	195	2,723	121,984,694
60	86	85	73	77	68	67	28	484	21,693,825
61	66	73	73	77	57	50	29	425	19,488,927
62	48	78	89	74	59	54	44	446	20,528,267
63	52	56	70	48	33	30	44	333	15,382,962
64	29	55	50	39	35	25	31	264	13,169,519
65	25	55	50	37	39	14	28	248	12,885,217
66	24	38	28	20	14	15	27	166	8,170,150
67	18	30	30	25	10	8	15	136	7,463,642
68	17	24	17	21	8	5	18	110	5,585,652
69	3	11	11	10	5	5	11	56	3,334,215
70 & Over	23	31	38	39	17	17	43	208	10,829,062
<b>Totals</b>	<b>6,473</b>	<b>4,083</b>	<b>3,233</b>	<b>2,702</b>	<b>1,635</b>	<b>1,248</b>	<b>634</b>	<b>20,008</b>	<b>\$814,719,814</b>

While not used in the financial computations, the following group averages are computed and shown because of their general interest.

Age: 45.7 years

Service: 11.1 years

Annual Pay: \$40,720

**Active Members as of June 30, 2014  
By Age and Years of Service**

**Female**

Near Age	Years of Service to Valuation Date							Totals	
	0-4	5-9	10-14	15-19	20-24	25-29	30 plus	No.	Valuation Payroll
Under 20	15							15	\$ 354,403
20-24	896	8						904	23,500,457
25-29	2,030	377	3					2,410	72,384,299
30-34	1,548	1,203	327	8				3,086	101,615,203
35-39	1,057	948	870	323	8			3,206	111,928,832
40-44	963	864	812	947	252	15		3,853	137,219,237
45-49	854	728	728	831	691	331	23	4,186	154,991,531
50-54	844	789	785	831	632	684	343	4,908	183,738,394
55-59	634	701	764	786	586	437	414	4,322	160,791,341
60	78	115	121	132	89	70	49	654	25,226,444
61	78	103	123	141	87	60	45	637	24,258,108
62	68	92	112	138	64	36	54	564	21,156,332
63	58	78	88	96	61	37	41	459	17,597,360
64	38	63	81	80	60	47	28	397	14,598,383
65	31	50	62	63	54	26	25	311	12,026,783
66	16	35	48	42	24	19	11	195	7,371,108
67	11	26	41	23	20	15	15	151	5,927,280
68	5	16	28	20	14	14	9	106	4,161,998
69	6	10	18	19	9	6	4	72	2,879,272
70 & Over	13	29	44	33	25	14	19	177	6,273,349
<b>Totals</b>	<b>9,243</b>	<b>6,235</b>	<b>5,055</b>	<b>4,513</b>	<b>2,676</b>	<b>1,811</b>	<b>1,080</b>	<b>30,613</b>	<b>\$1,088,000,114</b>

While not used in the financial computations, the following group averages are computed and shown because of their general interest.

Age: 45.7 years

Service: 11.5 years

Annual Pay: \$35,540



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**SECTION F**  
**METHODS & ASSUMPTIONS**

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## The Actuarial Valuation Process

An *actuarial valuation* is the mathematical process by which actuarial present values and contribution rates are determined. The flow of activity constituting the valuation may be summarized as follows:

- A. ***Census Data***, furnished by the system administrative staff, including:
  - Retired lives now receiving benefits
  - Former members with vested benefits not yet payable
  - Active members
- + B. ***Benefit Provisions*** governing future payments from the retirement system.
- + C. ***Asset data*** (cash & investments), furnished by the system administrative staff.
- + D. ***Assumptions concerning future experiences*** in various risk areas, which assumptions are established by the Board of Trustees after consulting with the actuary.
- + E. ***The funding method*** for employer contributions (the long-term planned pattern for employer contributions).
- + F. ***Mathematically combining the assumptions, the funding method, and the data.***
- = G. ***Determination of:***
  - Plan financial position and***
  - The employer contribution rate.***

## Meaning of "Unfunded Actuarial Accrued Liabilities"

*"Actuarial accrued liabilities"* are *the portion of the present value of plan promises to pay benefits in the future which are not covered by future normal cost contributions* --- a liability has been established ("accrued") because the service has been rendered but the resulting monthly cash benefit may not be payable until years in the future. Actuarial accrued liabilities are the result of complex mathematical calculations, which are made annually by the plan's actuary.

If "actuarial accrued liabilities" at any time exceed the actuarial value of the plan's accrued assets, the difference is *"unfunded actuarial accrued liabilities."* This is the common condition. If the plan's assets equaled the plan's "actuarial accrued liabilities," the plan would be termed "fully funded."

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Each time a plan adds a new benefit which applies to service already rendered, an "actuarial accrued liability" is created, which is also an "unfunded actuarial accrued liability" because the plan can't print instant cash to cover the value of the new benefit promises. Payment for such unfunded actuarial accrued liabilities is spread over a period of years.

Unfunded actuarial accrued liabilities can occur in another way: If actual financial experience is less favorable than assumed financial experience, the difference is added to unfunded actuarial accrued liabilities. In plans where benefits are directly related to an employee's pay near time of retirement, unfunded actuarial accrued liabilities increase when unexpected rates of pay increase create additional actuarial accrued liabilities which are not offset by favorable experience in other areas.

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The existence of unfunded actuarial accrued liabilities is not bad, but the changes from year to year in the amount of unfunded actuarial accrued liabilities are important and should be monitored.

Unfunded actuarial accrued liabilities are not a bill payable immediately but it is important that policy-makers prevent the amount from becoming unreasonably high and *it is vital for plans to have a sound method for making payments toward them* so that they will be controlled.

**Summary of Assumptions Used  
for the June 30, 2014 Actuarial Valuation**

-----**Economic Assumptions**-----

The economic assumptions were adopted by the Board on July 19, 2012 to be first effective for the June 30, 2012 valuation.

**The investment return rate** used in the valuations was 8.0% per year, compounded annually (net after investment expenses). This assumption is used to account for the fact that equal amounts of money payable at different points in time in the future do not have the same value presently.

**Pay increase assumptions** for individual active members are shown for sample ages on page 52. Part of the assumption for each age is for merit and/or seniority increase, and the other 3.0% recognizes wage inflation. This assumption is used to project a member's current salary to the salaries upon which benefits will be based.

**The active member payroll** is assumed to increase 3.0% annually, which is the portion of the individual pay increase assumptions attributable to wage inflation.

**The annual Cost-of-Living Adjustment (COLA)** is assumed to be 4.00%, on a compounded basis, when a minimum COLA of 4% is in effect (4.0% for 12 years, 3.06% the next year to reach a cumulative 65% followed by 2.0%). When no minimum COLA is in effect, price inflation is assumed to be 2.5% and the annual COLA is assumed to be 2.0% (80% of 2.5%), on a compounded basis.

-----**Non-Economic Assumptions**-----

The demographic assumptions were adopted by the Board on June 20, 2012 to be first effective for the June 30, 2012 valuation.

**The mortality table**, for post-retirement mortality, used in evaluating allowances to be paid was the RP 2000 combined healthy mortality table, projected to 2016 with Scale AA. Related values are shown on page 53. This assumption is used to measure the probabilities of each benefit payment being made after retirement. The pre-retirement mortality rates used were 100% of the post-retirement mortality rates for males and 80% of the post-retirement mortality for females.

The mortality tables include a margin of 15% for men and 17% for women for mortality improvements based on the four year experience study from June 30, 2007 to June 30, 2011.

## **Summary of Assumptions Used for the June 30, 2014 Actuarial Valuation**

*The probabilities of age and service retirement* are shown on page 54. It was assumed that each member will be granted one half year (4 months for 2011 plan members) of service credit for unused leave upon retirement and military service purchases.

*The probabilities of withdrawal from service, disability and death-in-service* are shown for sample ages on page 52. For disability retirement, impaired longevity was recognized by use of special mortality tables.

*The entry age normal actuarial cost method of valuation* was used in determining liabilities and normal cost. Each member's normal cost was based on the benefit provisions applicable to that member. The normal cost is projected to the applicable fiscal year. Differences in the past between assumed experience and actuarial experience ("actuarial gains and losses") become part of actuarial accrued liabilities. Unfunded actuarial accrued liabilities are amortized to produce payments, (principal & interest) which are level percents of payroll contributions.

*The amortization of the unfunded actuarial accrued liability is based on a closed 30-year amortization period, level percent of payroll amortization. This method was first effective with the June 30, 2014 valuation. The amortization is based on the projected unfunded actuarial accrued liability to the beginning of the fiscal year during which the contributions are expected to be made.*

*Employer contribution dollars* were assumed to be *paid in equal installments* throughout the employer's fiscal year.

*Actuarial value of assets.* Valuation assets recognize assumed investment return fully each year. Differences between actual and assumed investment return are phased-in over an open three-year period. Valuation assets are not permitted to deviate from the market value by less than 80% or more than 125%.

*The data about persons now covered and about present assets* were furnished by the System's administrative staff. Although examined for general reasonableness, the data was not audited by the Actuary.

*The liabilities for active members hired on or after January 1, 2011 were based on MSEP 2011 benefits. The liabilities for active members hired on or after July 1, 2000 (April 26, 2005 for Administrative Law Judges) were based on MSEP 2000 benefits. The liabilities for active members hired before July 1, 2000 for Elected Officials, General Assembly, and Uniformed Water Patrol were based on MSEP benefits. The liabilities for all other active members hired before July 1, 2000 were based on the assumption that members would elect MSEP 2000 prior to age 62 and MSEP on or after age 62.*

*For member on long-term disability, the actuarial accrued liability is the present value of benefit under active assumptions plus the difference of the present value of benefit with and without future pay growth to reflect indexing of pay in ultimate retirement benefits.*

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The actuarial valuation computations were made by or under the supervision of a Member of the American Academy of Actuaries (M.A.A.A.).

## Separations From Active Employment Before Service Retirement & Individual Pay Increase Assumptions June 30, 2014

Sample Ages	Years of Service	Percent of Active Members ----- Separating within the Next Year -----						Pay Increase Assumptions -- For An Individual Employee --		
		Withdrawal ***		Death*		Disability		Merit & Seniority**	Base (Economy)	Increase Next Year
		Men	Women	Men	Women	Men	Women			
	0	23.0 %	26.9 %							
	1	18.0	20.5							
	2	15.0	15.4							
	3	13.0	12.5							
	4	11.0	10.9							
25	5+	13.0	13.3	0.03 %	0.01 %	0.17 %	0.30 %	2.9 %	3.0 %	5.9 %
30		10.2	10.5	0.04	0.02	0.17	0.30	2.2	3.0	5.2
35		7.9	8.1	0.07	0.03	0.21	0.30	1.6	3.0	4.6
40		5.6	5.7	0.09	0.04	0.26	0.32	1.2	3.0	4.2
45		4.2	4.3	0.12	0.07	0.34	0.38	0.9	3.0	3.9
50		2.8	2.9	0.16	0.10	0.49	0.57	0.7	3.0	3.7
55		2.8	2.9	0.27	0.19	1.07	0.89	0.5	3.0	3.5
60		2.8	2.9	0.52	0.37	1.50	1.50	0.4	3.0	3.4
65		2.8	2.9	1.02	0.72	1.60	1.70	0.3	3.0	3.3
70		2.8	2.9	1.74	1.24	1.60	1.70	0.2	3.0	3.2

\* 2% of the deaths in active service are assumed to be duty related.

\*\* Does not apply to members of the General Assembly.

\*\*\* Does not apply to Elected Officials and Legislators.

### Elected Officials and Legislators

Percent of Active Members Separating within the Next Year	
Years of Service	Withdrawal Male/Female
1	8.0 %
2	8.0
3	8.0
4	8.0
5	12.0
6	12.0
7	12.0
8+	35.0

## Post-Retirement Mortality Rates

*The mortality tables* were the RP 2000 mortality table, projected to 2016 with Scale AA, including a margin of 15% for men and 17% for women for mortality improvements. Disabled mortality tables are the healthy mortality tables set forward 10 years. The pre-retirement mortality rates used were 100% of the post-retirement mortality rates for males and 80% of the post-retirement mortality for females.

Age	Service		Disability	
	Men	Women	Men	Women
45	0.0012	0.0009	0.0027	0.0024
50	0.0016	0.0013	0.0052	0.0047
55	0.0027	0.0024	0.0102	0.0090
60	0.0052	0.0047	0.0174	0.0155
65	0.0102	0.0090	0.0302	0.0247
70	0.0174	0.0155	0.0548	0.0410
75	0.0302	0.0247	0.0990	0.0703
80	0.0548	0.0410	0.1720	0.1255
85	0.0990	0.0703	0.2591	0.1884

## Retirement Values June 30, 2014

Sample Attained Ages	Present Value of \$1/Month the First Year (with 50% Joint & Survivor) Increasing 4.0% / 2.0% Yearly				Present Value of \$1/Month the First Year Increasing 2.0% Yearly			
	Service		Disability		Service		Disability	
	Men	Women	Men	Women	Men	Women	Men	Women
40	\$224.11	\$224.12	\$212.76	\$211.89	\$184.40	\$186.75	\$169.01	\$172.32
45	217.22	217.01	202.65	201.39	177.68	180.43	157.94	162.08
50	208.28	207.81	190.14	188.39	169.01	172.32	144.49	149.76
55	196.76	196.07	175.18	172.83	157.94	162.08	128.94	135.56
60	182.48	181.61	157.88	154.80	144.49	149.76	111.76	119.87
65	165.46	164.49	138.11	134.44	128.94	135.56	92.72	102.82
70	145.94	144.91	116.94	112.03	111.76	119.87	73.10	84.62
75	123.90	123.17	96.04	88.83	92.72	102.82	55.15	66.19
80	100.55	100.10	76.52	68.15	73.10	84.62	40.28	50.49
85	78.09	77.41	59.89	52.82	55.15	66.19	30.32	40.10

Sample Attained Ages	Future Life Expectancy (Years)			
	Service		Disability	
	Men	Women	Men	Women
40	41.95	44.10	32.39	34.43
45	37.15	39.24	27.68	29.69
50	32.39	34.43	23.13	25.13
55	27.68	29.69	18.87	20.84
60	23.13	25.13	14.96	16.90
65	18.87	20.84	11.39	13.32
70	14.96	16.90	8.29	10.12
75	11.39	13.32	5.83	7.37
80	8.29	10.12	4.03	5.31
85	5.83	7.37	2.91	4.05

### Percent of Eligible Active Members Retiring Next Year

Normal Retirement Pattern					Early Retirement Pattern		
Retirement Age	MSEP and MSEP 2000*			MSEP 2011**	Retirement Age	MSEP and MSEP 2000	MSEP 2011
	Percent Eligible			Percent Eligible		Percent Eligible	Percent Eligible
	1 <sup>st</sup> Year	2 <sup>nd</sup> Year	3 <sup>rd</sup> Year				
48	22%						
49	22	10%					
50	22	10	21%				
51	22	10	21				
52	22	10	21				
53	22	10	18				
54	22	10	18				
55	22	12	26	45%			
56	22	12	25	45			
57	22	12	22	35	57	2.5%	
58	22	12	22	35	58	3.5	
59	22	12	20	30	59	3.5	
60	21	12	22	35	60	5.0	
61	20	12	20	25	61	6.0	
62	19	22	30	40	62	6.0	10%
63	15	18	25	30	63	6.0	10
64	15	20	17	20	64	6.0	10
65	20	20	27	30	65	6.0	50
66	22	20	26	25	66	6.0	50
67	15	25	22	20	67	6.0	
68	15	20	22	20	68	6.0	
69	15	20	22	20	69	6.0	
70	25	20	22	20	70	6.0	
71	25	20	22	20	71	6.0	
72	25	20	22	20	72	6.0	
73	25	20	22	20	73	6.0	
74	25	20	22	20	74	6.0	
75	50	50	22	50	75	6.0	
76	50	50	22	50	76	6.0	
77	75	75	22	75	77	6.0	
78	100	100	100	100	78	100.0	

\* For members hired prior to January 1, 2011.

\*\* For members hired on or after January 1, 2011.



**Summary of Assumptions Used**  
**June 30, 2014**  
**Miscellaneous and Technical Assumptions**

<b>Pay Increase Timing:</b>	Beginning of (Fiscal) year.
<b>Decrement Timing:</b>	Decrements of all types are assumed to occur mid-year.
<b>Eligibility Testing:</b>	Eligibility for benefits is determined based upon the age nearest birthday and service nearest whole year on the date the decrement is assumed to occur.
<b>Benefit Service:</b>	Exact fractional service is used to determine the amount of the benefit payable.
<b>Decrement Relativity:</b>	Decrement rates are used directly from the experience study, without adjustment for multiple decrement table effects.
<b>Decrement Operation:</b>	Disability and withdrawal do not operate during normal retirement eligibility.
<b>Normal Form of Benefit:</b>	The assumed normal form of benefit is the straight life form for MSEP 2000 with 50% continuing to an eligible surviving spouse for MSEP. No adjustment has been made for post-retirement option election changes.
<b>Other Liability Adjustments:</b>	<b><i>MSEP 2000 Benefits for Active Employees</i></b>

Option elections were studied for MSEP 2000 retirees and we believe that the normal and early retirement alternate forms of payment assumption are slightly negatively subsidized. We have adjusted the actuarial accrued liability and normal cost by a factor of 0.99 for MSEP 2000 and MSEP 2011 retirements and by .995 for MSEP retirements based on the current rate of form of payment elections.

***Pre-Retirement Survivor Benefits for Spouse of Terminated Vested Member***

<u>Age</u>	<u>Male/Female</u>
<30	1.97/1.68
30-39	1.40/1.29
40-49	1.15/1.11
>50	1.04/1.03

These factors are used to estimate the cost of immediate unreduced survivor annuities upon the death of a vested member.

**Summary of Assumptions Used**  
**June 30, 2014**  
**Miscellaneous and Technical Assumptions**  
**(Continued)**

<b>Incidence of Contributions:</b>	Contributions are assumed to be received continuously throughout the year based upon the computed percent of payroll shown in this report, and the actual payroll payable at the time contributions are made. New entrant normal cost contributions are applied to the funding of new entrant benefits.
<b>MSEP 2000 Election:</b>	All regular state employees hired on or before June 30, 2000 are assumed to elect MSEP 2000 prior to age 62 and MSEP on or after age 62. Elected Officials, General Assembly, and Uniformed Water Patrol Members hired before July 1, 2000 and Administrative Law Judges hired before April 26, 2005 are assumed to elect MSEP at retirement.
<b>Service Adjustment:</b>	It is assumed that each member will be granted one half year of service credit, 3 months for unused leave upon retirement and 3 months for military service purchases. For members hired on or after January 1, 2011 it is assumed that each member will be granted 4 months for unused leave.
<b>Marriage Assumption:</b>	It is assumed that among active members 75% are married at retirement, 70% of those dying in active service are married, and men are three years older than their spouses.
<b>Forfeitures:</b>	For those hired on or after January 1, 2011, 50% of state employees terminating at first vesting eligibility are assumed to take a refund and forfeit their deferred pension. This percentage decreases to 0% at first retirement eligibility.
<b>Salary and Benefit Limits:</b>	For purposes of the valuation, no limits were applied to member compensation or benefits.

*The number of active members* is assumed to remain constant although certain new hires on or after July 1, 2002 will participate in the Colleges and Universities Retirement Plan. Active and retired member data is reported as of May 31. It is assumed for valuation purposes that there is no turnover among members and no new entrants during the month of June. New entrant assumed demographic patterns are based on the demographics of active members hired within the last five years.

**Summary of Assumptions Used**  
**June 30, 2014**  
**Miscellaneous and Technical Assumptions**  
**(Concluded)**

**Data Adjustments:**

Active and retired member data was reported as of May 31, 2014. It was brought forward to June 30, 2014 by adding one month of service for all active members and the June COLA for certain retired members. It is expected that this procedure resulted in a slight overstatement of total liabilities as of June 30, 2014. Financial information continues to be reported as of June 30. This procedure was instituted to provide sufficient time for the Board of Trustees to certify the appropriate contribution rate prior to the October 1 statutory deadline.

Active members reported with less than a \$100 annualized salary were assumed to receive the average active member pay, which is \$37,553 (\$103,607 for Administrative Law Judges) as of June 30, 2014. There were 17 members affected by this assumption.

When the option of choosing plans is available, terminated vested members are reported with two records, one with benefits under the MSEP plan and one with benefits under the MSEP 2000 plan. Because it is unknown what the member will elect at retirement, both records are valued and the plan that produces the higher present value of future benefits is used for valuation purposes.

For any retired member who has elected a joint and survivor benefit yet has no beneficiary date of birth provided, it was assumed that the beneficiary is 3 years younger for male retirees and 3 years older for female retirees.

For the terminated vested members, GRS staff found one member less than what was initially reported. This was confirmed with MOSERS Staff.

For members reported with no gender, the member is assumed to be male.

Due to limitations in our valuation program, members who are not eligible for normal retirement prior to age 85 had their date of birth adjusted.

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SECTION G  
PLAN PROVISIONS

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**Summary of Benefit Provisions Evaluated  
June 30, 2014 Actuarial Valuation**

<p align="center"><b>MSEP (Missouri State Employees' Plan)</b></p>	<p align="center"><b>MSEP 2000 (Missouri State Employees' Plan 2000)</b></p>	<p align="center"><b>MSEP 2011 (Missouri State Employees' Plan 2011)</b></p>
<p><b>PARTICIPATION</b></p> <p>Participants include:</p> <p>All MOSERS members, vested former members, retirees and survivors who first became members prior to July 1, 2000 and who do <b>not</b> elect to transfer to the MSEP 2000 plan. Election is made at the time benefits commence.</p> <p><b>AVERAGE COMPENSATION USED FOR BENEFIT DETERMINATION</b></p> <p>The average annual compensation of a member for the three consecutive years of service during which pay was highest (overtime pay is included for purposes of determining Average Compensation). Non-recurring lump sum payments are excluded. Unused sick leave may be converted to additional credited service (usable only for benefit computation, not eligibility).</p>	<p><b>PARTICIPATION</b></p> <p>Participants include:</p> <ol style="list-style-type: none"> <li>(1) All new employees who first become members on or after July 1, 2000, except full-time teaching and senior administrative personnel of the regional colleges and universities hired on or after July 1, 2002 who will be participants in the Colleges and Universities Retirement Plan.</li> <li>(2) MSEP active members and vested former members who elect to transfer to the MSEP 2000 plan prior to retirement.</li> <li>(3) MSEP retirees who elect to transfer to the MSEP 2000 plan during the election window from July 1, 2000 through June 30, 2001, and their survivors.</li> <li>(4) MSEP non-vested terminations rehired on or after July 1, 2000.</li> </ol> <p>The average annual compensation of a member for the three consecutive years of service during which pay was highest (overtime pay is included for purposes of determining Average compensation). Non-recurring lump sum payments are excluded. Unused sick leave may be converted to additional credited service (usable only for benefit computation, not eligibility).</p>	<p><b>PARTICIPATION</b></p> <p>Participants include:</p> <p>All new employees who first become employees on or after January 1, 2011.</p> <p>The average annual compensation of a member for the three consecutive years of service during which pay was highest (overtime pay is included for purposes of determining Average compensation). Non-recurring lump sum payments are excluded. Unused sick leave may be converted to additional credited service (usable only for benefit computation, not eligibility).</p>

<b>MSEP</b> <b>(Missouri State Employees' Plan)</b>	<b>MSEP 2000</b> <b>(Missouri State Employees' Plan 2000)</b>	<b>MSEP 2011</b> <b>(Missouri State Employees' Plan 2011)</b>
<p><b>NORMAL RETIREMENT ELIGIBILITY (UNREDUCED BENEFITS)</b></p> <p><b>Members of the General Assembly:</b> Age 55 with completion of at least 3 full biennial assemblies.</p> <p><b>Statewide Elected Officials:</b> The earliest of attaining:</p> <ol style="list-style-type: none"> <li>(1) Age 65 with at least 4 years of credited service.</li> <li>(2) Age 60 with at least 15 years of credited service.</li> <li>(3) Age 50 with age plus credited service equal to 80 or more.</li> </ol> <p><b>General Employees:</b> The earliest of attaining:</p> <ol style="list-style-type: none"> <li>(1) Age 65 and active with at least 4 years of credited service.</li> <li>(2) Age 65 with at least 5 years of credited service.</li> <li>(3) Age 60 with at least 15 years of credited service.</li> <li>(4) Age 48 with age plus credited service equal to 80 or more.</li> </ol> <p><b>Uniformed Water Patrol Employees:</b> The earliest of attaining:</p> <ol style="list-style-type: none"> <li>(1) Age 55 and active with at least 4 years of credited service.</li> <li>(2) Age 55 with at least 5 years of credited service.</li> <li>(3) Age 48 with age plus credited service equal to 80 or more.</li> </ol> <p><b>Administrative Law Judges:</b> The earliest of attaining:</p> <ol style="list-style-type: none"> <li>(1) Age 62 and active with at least 12 years of credited service.</li> <li>(2) Age 60 with at least 15 years of credited service.</li> <li>(3) Age 55 with at least 20 years of credited service.</li> </ol>	<p><b>Members of the General Assembly:</b> The earliest of attaining:</p> <ol style="list-style-type: none"> <li>(1) Age 55 with completion of at least 3 full biennial assemblies.</li> <li>(2) Age 50 with completion of at least 3 full biennial assemblies and with age plus credited service equal to 80 or more.</li> </ol> <p><b>Statewide Elected Officials:</b> The earliest of attaining:</p> <ol style="list-style-type: none"> <li>(1) Age 55 with at least 4 years of credited service as a statewide elected official.</li> <li>(2) Age 50 with age plus credited service equal to 80 or more.</li> </ol> <p><b>General Employees:</b> The earliest of attaining:</p> <ol style="list-style-type: none"> <li>(1) Age 62 with at least 5 years of credited service.</li> <li>(2) Age 48 with age plus credited service equal to 80 or more.</li> </ol>	<p><b>Members of the General Assembly:</b> The earliest of attaining:</p> <ol style="list-style-type: none"> <li>(1) Age 62 with completion of at least 3 full biennial assemblies.</li> <li>(2) Age 55 with completion of at least 3 full biennial assemblies and with age plus credited service equal to 90 or more.</li> </ol> <p><b>Statewide Elected Officials:</b> The earliest of attaining:</p> <ol style="list-style-type: none"> <li>(1) Age 62 with at least 4 years of credited service as a statewide elected official.</li> <li>(2) Age 55 with age plus credited service equal to 90 or more.</li> </ol> <p><b>General Employees:</b> The earliest of attaining:</p> <ol style="list-style-type: none"> <li>(1) Age 67 with at least 10 years of credited service.</li> <li>(2) Age 55 with age plus credited service equal to 90 or more.</li> </ol>

<p align="center"><b>MSEP</b> <b>(Missouri State Employees' Plan)</b></p>	<p align="center"><b>MSEP 2000</b> <b>(Missouri State Employees' Plan 2000)</b></p>	<p align="center"><b>MSEP 2011</b> <b>(Missouri State Employees' Plan 2011)</b></p>
<p><b>BENEFIT AMOUNT</b></p> <p><i>Members of the General Assembly:</i> \$150 per month per biennial assembly served.</p> <p><i>Statewide Elected Officials:</i></p> <ol style="list-style-type: none"> <li>1) Less than 12 years of credited service: 1.6% of Average Compensation times years of credited service.</li> <li>2) 12 or more years of credited service: 50% of pay of the highest elected position held prior to retirement.</li> </ol> <p><i>General Employees:</i> 1.6% of Average Compensation times years of credited service.</p> <p>2.1% of Average Compensation times years of credited service for any period of non-social security covered employment transferred from the Public School Retirement System.</p> <p><i>Uniformed Water Patrol:</i> 2.13% of Average Compensation times years of credited service.</p> <p><i>Administrative Law Judges:</i> 50% of Compensation.</p>	<p><i>Members of the General Assembly:</i> 1/24 of pay times first 24 years of credited service as a member of the General Assembly.</p> <p><i>Statewide Elected Officials:</i> 1/24 of pay (of the highest elected position held prior to retirement) times the first 12 years of credited service as a statewide elected official.</p> <p><i>General Employees:</i> 1.7% of Average Compensation times years of credited service.</p> <p>Temporary Benefit: If member retires between ages 48 and 62 with age plus credited service equal to 80 or more, a temporary benefit is payable until the attainment of the minimum age at which reduced social security benefits are payable, in the amount of 0.8% of Average Compensation times years of credited service.</p> <p>Non- Social Security Covered Service: 2.5% of Average Compensation times years of credited service for any period of non-social security covered employment transferred from the Public School Retirement System.</p>	<p><i>Members of the General Assembly:</i> 1/24 of pay times first 24 years of credited service as a member of the General Assembly.</p> <p><i>Statewide Elected Officials:</i> 1/24 of pay (of the highest elected position held prior to retirement) times the first 12 years of credited service as a statewide elected official.</p> <p><i>General Employees:</i> 1.7% of Average Compensation times years of credited service.</p> <p>Temporary Benefit: If member retires between ages 55 and 62 with age plus credited service equal to 90 or more, a temporary benefit is payable until the attainment of the minimum age at which reduced social security benefits are payable, in the amount of 0.8% of Average Compensation times years of credited service.</p> <p>Non- Social Security Covered Service: 2.5% of Average Compensation times years of credited service for any period of non-social security covered employment transferred from the Public School Retirement System.</p>

<b>MSEP (Missouri State Employees' Plan)</b>	<b>MSEP 2000 (Missouri State Employees' Plan 2000)</b>	<b>MSEP 2011 (Missouri State Employees' Plan 2011)</b>																																																
<p><b>EARLY RETIREMENT FOR GENERAL EMPLOYEES</b></p> <p><i>Eligibility:</i> Age 55 with at least 10 years of credited service.</p> <p><i>Amount:</i> Normal retirement amount reduced by ½% for each month that retirement precedes eligibility for normal retirement.</p> <ol style="list-style-type: none"> <li>1) Less than 15 years of service: Normal retirement amount actuarially reduced for years younger than age 65.</li> <li>2) 15 years but less than 20 years of service, and less than the number of years of service necessary for age and service to total 80: Normal retirement amount actuarially reduced for years younger than age 60.</li> <li>3) 20 or more years of service, but less than the number of years of service necessary for age and service to total 80: Normal retirement amount reduced for years younger than the 80 and out eligibility date.</li> </ol> <p><b>Vested Deferred Benefits</b></p> <p>Benefits for employees who terminate prior to eligibility for an immediate benefit are considered to be vested in accordance with the following schedule (benefits commence at the age the individual would have been eligible for early or normal retirement, considering years of credited service). Unused sick leave is not converted.</p> <table border="1" data-bbox="65 1284 695 1446"> <thead> <tr> <th>Years of Service</th> <th>General Assembly</th> <th>Elected Officials</th> <th>General Employees</th> </tr> </thead> <tbody> <tr> <td>4</td> <td></td> <td>100%</td> <td></td> </tr> <tr> <td>5</td> <td></td> <td></td> <td>100%</td> </tr> <tr> <td>6 (3 Assemblies)</td> <td>100%</td> <td></td> <td></td> </tr> </tbody> </table>	Years of Service	General Assembly	Elected Officials	General Employees	4		100%		5			100%	6 (3 Assemblies)	100%			<p><i>Eligibility:</i> Age 57 with at least 5 years of credited service.</p> <p><i>Amount:</i> Normal retirement amount reduced by ½% for each month that retirement precedes eligibility for normal retirement. Normal retirement is age 62.</p> <p>Benefits for employees who terminate prior to eligibility for an immediate benefit are considered to be vested in accordance with the following schedule (benefits commence at age 57 for early retirement or 62 for normal retirement). Unused sick leave is not converted.</p> <table border="1" data-bbox="726 1219 1371 1446"> <thead> <tr> <th>Years of Service</th> <th>General Assembly</th> <th>Elected Officials</th> <th>General Employees</th> </tr> </thead> <tbody> <tr> <td>4</td> <td></td> <td>100%</td> <td></td> </tr> <tr> <td>5</td> <td></td> <td></td> <td>100%</td> </tr> <tr> <td>6 (3 Assemblies) HB1455 prospectively</td> <td>100%</td> <td></td> <td></td> </tr> </tbody> </table>	Years of Service	General Assembly	Elected Officials	General Employees	4		100%		5			100%	6 (3 Assemblies) HB1455 prospectively	100%			<p><i>Eligibility:</i> Age 62 with at least 10 years of credited service.</p> <p><i>Amount:</i> Normal retirement amount reduced by ½% for each month that retirement precedes eligibility for normal retirement. Normal retirement is age 67.</p> <p>Benefits for employees who terminate prior to eligibility for an immediate benefit are considered to be vested in accordance with the following schedule (benefits commence at age 67 normal retirement). Unused sick leave is not converted.</p> <table border="1" data-bbox="1396 1203 2041 1446"> <thead> <tr> <th>Years of Service</th> <th>General Assembly</th> <th>Elected Officials</th> <th>General Employees</th> </tr> </thead> <tbody> <tr> <td>4</td> <td></td> <td>100%</td> <td></td> </tr> <tr> <td>6 (3 Assemblies) HB1455 prospectively</td> <td>100%</td> <td></td> <td></td> </tr> <tr> <td>10</td> <td></td> <td></td> <td>100%</td> </tr> </tbody> </table>	Years of Service	General Assembly	Elected Officials	General Employees	4		100%		6 (3 Assemblies) HB1455 prospectively	100%			10			100%
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<p align="center"><b>MSEP (Missouri State Employees' Plan)</b></p>	<p align="center"><b>MSEP 2000 (Missouri State Employees' Plan 2000)</b></p>	<p align="center"><b>MSEP 2011 (Missouri State Employees' Plan 2011)</b></p>
<p><b>DEATH PRIOR TO RETIREMENT</b></p> <p>The surviving spouse benefit is computed as if the member had been normal age on the date of death and elected the joint and 100% survivor optional form of payment, provided the member had at least 5 years of credited service and was married on the date of death. If no eligible spouse survives, 80% of the member's life income annuity is paid to eligible children until age 21. If the death is duty related, the service requirement is waived and the minimum spouse benefit is 50% of Average Compensation (rate of compensation for members of the General Assembly).</p>	<p>The surviving spouse benefit is computed as if the member had been normal age on the date of death and elected the joint and 100% survivor optional form of payment, provided the member had at least 5 years of credited service (3 full assemblies for a member of the General Assembly, 4 years of credited service for a statewide elected official). If no eligible spouse survives, 80% of the member's life income annuity is paid to eligible children until age 21. If the death is duty related, the service requirement is waived and the minimum spouse benefit is 50% of Average Compensation (rate of compensation for members of the General Assembly).</p>	<p>The surviving spouse benefit is computed as if the member had been normal age on the date of death and elected the joint and 100% survivor optional form of payment, provided the member had at least 5 years of credited service (2 full assemblies for a member of the General Assembly, 4 years of credited service for a statewide elected official). If no eligible spouse survives, 80% of the member's life income annuity is paid to eligible children until age 21. If the death is duty related, the service requirement is waived and the minimum spouse benefit is 50% of Average Compensation (rate of compensation for members of the General Assembly).</p>

<b>MSEP (Missouri State Employees' Plan)</b>	<b>MSEP 2000 (Missouri State Employees' Plan 2000)</b>	<b>MSEP 2011 (Missouri State Employees' Plan 2011)</b>
<p><b>DEATH AFTER RETIREMENT</b></p> <p>50% of the benefit the retired member was receiving on the date of death (the normal form of payment), or the benefit payable under the joint and survivor or period certain form of payment, if the member elected an optional form of payment at time of retirement and provided the member was married on their date of retirement. Effective July 1, 2000, a member who is not married at retirement but marries thereafter may designate a spouse as beneficiary within one year of marriage. Additionally, a member may designate a new spouse as beneficiary within one year of marriage in the event of the death of the spouse the member was married to at the date of retirement (this provision does not apply to period certain annuities).</p> <p><b>DISABILITY (RECIPIENTS OF LTD BENEFITS)</b></p> <p>Normal retirement benefits become payable at the time the member is eligible for normal retirement, and are computed based on: i) the service that would have accrued to the member if active employment had continued; and ii) the member's rate of pay at the time of disability (if the member retires on or after August 28, 1999, the member's rate of pay is based on the rate of pay at the time of disability indexed to the time of benefit commencement). An exception is Uniformed Water Patrol employees who are eligible for an immediate occupational disability benefit equal to 50% of pay at time of disability.</p>	<p>The benefit payable under the joint and survivor or period certain form of payment, if the member elected an optional form of payment at time of retirement. A member who is not married at retirement but marries thereafter may designate a spouse as beneficiary within one year of marriage. Additionally, a member may designate a new spouse as beneficiary within one year of marriage in the event of the death of the spouse the member was married to at the date of retirement (this provision does not apply to period certain annuities).</p> <p>Normal retirement benefits become payable at the time the member is eligible for normal retirement, and are computed based on: i) the service that would have accrued to the member if active employment had continued; and ii) the member's rate of pay at the time of disability indexed to the time of benefit commencement. The annual percentage increase in the pay used to compute benefits is the lesser of: i) 80% of the CPI increase and ii) 5%.</p>	<p>The benefit payable under the joint and survivor or period certain form of payment, if the member elected an optional form of payment at time of retirement. A member who is not married at retirement but marries thereafter may designate a spouse as beneficiary upon completion of one year of marriage. Additionally, a member may designate a new spouse as beneficiary upon completion of one year of marriage in the event of the death of the spouse the member was married to at the date of retirement (this provision does not apply to period certain annuities).</p> <p>Normal retirement benefits become payable at the time the member is eligible for normal retirement, and are computed based on: i) the service that would have accrued to the member if active employment had continued; and ii) the member's rate of pay at the time of disability indexed to the time of benefit commencement. The annual percentage increase in the pay used to compute benefits is the lesser of: i) 80% of the CPI increase and ii) 5%.</p>

<p align="center"><b>MSEP (Missouri State Employees' Plan)</b></p>	<p align="center"><b>MSEP 2000 (Missouri State Employees' Plan 2000)</b></p>	<p align="center"><b>MSEP 2011 (Missouri State Employees' Plan 2011)</b></p>												
<p><b>POST-RETIREMENT BENEFIT ADJUSTMENTS</b></p> <p>Benefits are increased to retired members (including survivors) annually in accordance with the following formulas:</p> <table border="1" data-bbox="86 444 669 769"> <thead> <tr> <th>Increase in CPI</th> <th>Formula 1 Benefit Increase</th> <th>Formula 2 Benefit Increase</th> </tr> </thead> <tbody> <tr> <td>5.00% or less</td> <td>4%</td> <td>80% of CPI increase</td> </tr> <tr> <td>5.01% - 6.24%</td> <td>80% of CPI increase</td> <td>80% of CPI increase</td> </tr> <tr> <td>6.25% or more</td> <td>5%</td> <td>5%</td> </tr> </tbody> </table> <p>Members first hired prior to August 28, 1997 receive COLAs based on Formula 1 until an aggregate increase of 65% is reached. At that point subsequent COLAs based on Formula 2 are granted.</p> <p>Members first hired on or after August 28, 1997 receive COLAs based solely on Formula 2.</p> <p>Statewide Elected Officials with 12 or more years of service have their benefit adjusted annually based on the increase in the pay for an active statewide elected official in the member's highest elected position.</p> <p>Members who are fully vested and work beyond age 65 will have their monthly benefit increased upon retirement. The percentage increase in benefit is equal to all COLAs for the years between age 65 and date of retirement, not to exceed 65% and counts toward the Formula 1 65% maximum.</p>	Increase in CPI	Formula 1 Benefit Increase	Formula 2 Benefit Increase	5.00% or less	4%	80% of CPI increase	5.01% - 6.24%	80% of CPI increase	80% of CPI increase	6.25% or more	5%	5%	<p>Benefits are increased to retired members (including survivors) annually in accordance with the following:</p> <p><i>Members of the General Assembly:</i> Benefit is adjusted annually based on the increase in the pay for an active member of the General Assembly.</p> <p><i>Statewide Elected Officials:</i> Benefit is adjusted annually based on the increase in the pay for an active statewide elected official in the retired member's highest elected position.</p> <p><i>General Employees:</i> Annual benefit percentage increase equal to the lesser of: i) 80% of the CPI increase, and 5%.</p> <p>CPI: For the basis of determining CPI, the average monthly reported CPI for the prior calendar year is divided by the average monthly reported CPI for the second prior calendar year to determine the current year increases, if any. If this amount is less than one, benefits are not reduced, nor is there any cumulative effect on future years determination of CPI.</p> <p>Timing of Increase: Benefits are adjusted on the anniversary of the effective date of retirement for most members. Members retiring under the BackDROP provisions have an anniversary based on the retroactive starting date for the BackDROP.</p>	<p>Benefits are increased to retired members (including survivors) annually in accordance with the following:</p> <p><i>Members of the General Assembly:</i> Benefit is adjusted annually based on the increase in the pay for an active member of the General Assembly.</p> <p><i>Statewide Elected Officials:</i> Benefit is adjusted annually based on the increase in the pay for an active statewide elected official in the retired member's highest elected position.</p> <p><i>General Employees:</i> Annual benefit percentage increase equal to the lesser of: i) 80% of the CPI increase, and 5%.</p> <p>CPI: For the basis of determining CPI, the average monthly reported CPI for the prior calendar year is divided by the average monthly reported CPI for the second prior calendar year to determine the current year increases, if any. If this amount is less than one, benefits are not reduced, nor is there any cumulative effect on future years determination of CPI.</p> <p>Timing of Increase: Benefits are adjusted on the anniversary of the effective date of retirement.</p>
Increase in CPI	Formula 1 Benefit Increase	Formula 2 Benefit Increase												
5.00% or less	4%	80% of CPI increase												
5.01% - 6.24%	80% of CPI increase	80% of CPI increase												
6.25% or more	5%	5%												

<p align="center"><b>MSEP</b> <b>(Missouri State Employees' Plan)</b></p>	<p align="center"><b>MSEP 2000</b> <b>(Missouri State Employees' Plan 2000)</b></p>	<p align="center"><b>MSEP 2011</b> <b>(Missouri State Employees' Plan 2011)</b></p>
<p><b>POP-UP PROVISION</b></p> <p>Benefits to members who choose a survivor form of payment and whose spouse precedes the member in death, will "pop-up" or revert to the amount the member would have received had he/she not elected a survivor option.</p> <p><b>PORTABILITY</b></p> <p>Purchase/Transfer Provisions (in addition to military). Effective August 28, 1999, a member may purchase up to four years of non-federal full-time Missouri public service, provided the member is not vested in another retirement system for that same service.</p> <p><b>MEMBER CONTRIBUTIONS.</b> None.</p> <p><b>BACKDROP.</b> See following page.</p>	<p>Same.</p> <p>Purchase/Transfer Provisions (in addition to military). A member may purchase up to four years of non-federal full-time Missouri public service, provided the member is not vested in another retirement system for that same service. Local vested service credit granted after 10 years of state service if the other retirement plan agrees to transfer assets equal to the accrued liability to MOSERS.</p> <p>Same as MSEP.</p> <p>Same as MSEP.</p>	<p>Same.</p> <p>May purchase qualifying public sector service at full actuarial cost.</p> <p>4.0% of salary, with 4.0% interest credited to member contributions.</p> <p>Not eligible for the BackDROP.</p>

<b>MSEP (Missouri State Employees' Plan)</b>	<b>MSEP 2000 (Missouri State Employees' Plan 2000)</b>	<b>MSEP 2011 (Missouri State Employees' Plan 2011)</b>
<p><b>BACKDROP</b></p> <p>To be eligible to participate in the BackDROP, a member must have been eligible to retire under normal age and/or service conditions for at least two years. A retroactive starting date is established for BackDROP purposes which is the later of: 1) the member's normal retirement date or 2) five years prior to the annuity starting date under the retirement plan selected by the member.</p> <p>A member may elect the BackDROP period for the accumulation of the BackDROP account in 12 month increments prior to their actual retirement date or back to the earliest possible date. This results in a BackDROP period of one to five years depending upon the individual situation.</p> <p>A theoretical BackDROP account is accumulated that includes 90% of the value of the benefit payments that would have been paid during the BackDROP period had the member retired at the retroactive starting date with their respective option election. These payments include applicable post-retirement benefit increases.</p> <p>The member is paid the resulting lump sum value of the BackDROP account as of the annuity starting date or as three equal annual installments beginning at the annuity starting date.</p> <p>The annuity benefit payable from the actual retirement date is computed with years of service and average pay as of the retroactive starting date for the BackDROP. Post-retirement benefit increases that occurred during the BackDROP period are applied in the calculation of the monthly annuity.</p>	<p>Same as MSEP.</p>	<p>Not eligible for the BackDROP.</p>

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SECTION H  
GLOSSARY

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## June 30, 2014 Actuarial Valuation Glossary

**Actuarial Accrued Liability.** The difference between (i) the actuarial present value of future plan benefits, and (ii) the actuarial present value of future normal cost. Sometimes referred to as "accrued liability" or "past service liability."

**Accrued Service.** The service credited under the plan which was rendered before the date of the actuarial valuation.

**Actuarial Assumptions.** Estimates of future plan experience with respect to rates of mortality, disability, turnover, retirement, rate or rates of investment income and salary increases. Decrement assumptions (rates of mortality, disability, turnover and retirement) are generally based on past experience, often modified for projected changes in conditions. Economic assumptions (salary increases and investment income) consist of an underlying rate in an inflation-free environment plus a provision for a long-term average rate of inflation.

**Actuarial Cost Method.** A mathematical budgeting procedure for allocating the dollar amount of the "actuarial present value of future plan benefits" between the actuarial present value of future normal cost and the actuarial accrued liability. Sometimes referred to as the "actuarial funding method."

**Actuarial Equivalent.** A series of payments is called an actuarial equivalent of another series of payments if the two series have the same actuarial present value.

**Actuarial Present Value.** The amount of funds presently required to provide a payment or series of payments in the future. It is determined by discounting the future payments at a predetermined rate of interest, taking into account the probability of payment.

**Actuarial Value of Assets.** Also referred to as funding value of assets, smoothed market value of assets, or valuation assets.

Valuation assets recognize assumed investment return fully each year. Differences between actual and assumed investment return are phased-in over an open 3-year period. Valuation assets are not permitted to deviate from the market value by less than 80% or more than 125%. This treatment helps remove the timing of investment activities from the valuation process. During periods when investment performance exceeds the assumed rate, valuation assets will tend to be less than market value. During periods when investment performance is less than the assumed rate, valuation assets will tend to be greater than market value.

**Amortization.** Paying off an interest-bearing liability by means of periodic payments of interest and principal, as opposed to paying it off with a lump sum payment.

**Experience Gain (Loss).** A measure of the difference between actual experience and that expected based upon a set of actuarial assumptions during the period between two actuarial valuation dates, in accordance with the actuarial cost method being used.

**Normal Cost.** The annual cost assigned, under the actuarial funding method, to current and subsequent plan years. Sometimes referred to as "current service cost." Any payment toward the unfunded actuarial accrued liability is not part of the normal cost.

(continued on following page)

## June 30, 2014 Actuarial Valuation

### Glossary

#### (concluded)

***Plan Termination Liability.*** The actuarial present value of future plan benefits based on the assumption that there will be no further accruals for future service and salary. The termination liability will generally be less than the liabilities computed on a "going concern" basis and is not normally determined in a routine actuarial valuation.

***Reserve Account.*** An account used to indicate that funds have been set aside for a specific purpose and are not generally available for other uses.

***Unfunded Actuarial Accrued Liability.*** The difference between the actuarial accrued liability and actuarial value of assets. Sometimes referred to as "unfunded accrued liability."

The existence of unfunded actuarial accrued liabilities is not in itself bad, any more than a mortgage on a house is bad. Unfunded actuarial accrued liabilities do not represent a debt that is payable today. What is important is the ability to amortize the unfunded actuarial accrued liabilities and the trend in their amount (after due allowance for devaluation of the dollar).

***Valuation Payroll.*** Active member payroll that is intended to reflect the annual salary considered as covered compensation for Retirement System benefits.



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SECTION I

OTHER SPECIAL REQUIREMENTS

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## Basic Series Year-by-Year Total Returns (1926 – 2013)

For Stocks, Bonds, and Bills,  
RED means a Real Return of less than 3%  
[(Total Return - Inflation) < 3%]

For Inflation,  
RED means a loss of purchasing power

Year	Large Company Stocks	Small Company Stocks	Long-Term Corporate Bonds	Long-Term Government Bonds	Intermed.-Term Government Bonds	U.S. Treasury Bills	Inflation *
1926	11.62	0.28	7.37	7.77	5.38	3.27	-1.49
1927	37.49	22.10	7.44	8.93	4.52	3.12	-2.08
1928	43.61	39.69	2.84	0.10	0.92	3.56	-0.97
1929	-8.42	-51.36	3.27	1.17	6.01	4.75	0.20
1930	-24.90	-38.15	7.98	4.66	6.72	2.41	-6.03
1931	-43.34	-49.75	-1.85	-5.31	-2.32	1.07	-9.52
1932	-8.19	-5.39	10.32	16.84	8.81	0.96	-10.30
1933	53.99	142.87	10.38	-0.07	1.83	0.30	0.51
1934	-1.44	24.22	13.84	10.03	9.00	0.16	2.03
1935	47.67	40.19	9.61	4.98	7.01	0.17	2.99
1936	33.92	64.80	6.74	7.52	3.06	0.18	1.21
1937	-35.03	-58.01	2.75	0.23	1.56	0.31	3.10
1938	31.12	32.80	6.13	5.53	6.23	-0.02	-2.78
1939	-0.41	0.35	3.97	5.94	4.52	0.02	-0.48
1940	-9.78	-5.16	3.39	6.09	2.96	0.00	0.96
1941	-11.59	-9.00	2.73	0.93	0.50	0.06	9.72
1942	20.34	44.51	2.60	3.22	1.94	0.27	9.29
1943	25.90	88.37	2.83	2.08	2.81	0.35	3.16
1944	19.75	53.72	4.73	2.81	1.80	0.33	2.11
1945	36.44	73.61	4.08	10.73	2.22	0.33	2.25
1946	-8.07	-11.63	1.72	-0.10	1.00	0.35	18.16
1947	5.71	0.92	-2.34	-2.62	0.91	0.50	9.01
1948	5.50	-2.11	4.14	3.40	1.85	0.81	2.71
1949	18.79	19.75	3.31	6.45	2.32	1.10	-1.80
1950	31.71	38.75	2.12	0.06	0.70	1.20	5.79
1951	24.02	7.80	-2.69	-3.93	0.36	1.49	5.87
1952	18.37	3.03	3.52	1.16	1.63	1.66	0.88
1953	-0.99	-6.49	3.41	3.64	3.23	1.82	0.62
1954	52.62	60.58	5.39	7.19	2.68	0.86	-0.50
1955	31.56	20.44	0.48	-1.29	-0.65	1.57	0.37
1956	6.56	4.28	-6.81	-5.59	-0.42	2.46	2.86
1957	-10.78	-14.57	8.71	7.46	7.84	3.14	3.02
1958	43.36	64.89	-2.22	-6.09	-1.29	1.54	1.76
1959	11.96	16.40	-0.97	-2.26	-0.39	2.95	1.50
1960	0.47	-3.29	9.07	13.76	11.76	2.66	1.48
1961	26.89	32.09	4.82	0.97	1.85	2.13	0.67
1962	-8.73	-11.90	7.95	6.89	5.56	2.73	1.22
1963	22.80	23.57	2.19	1.21	1.64	3.12	1.65
1964	16.48	23.52	4.77	3.51	4.04	3.54	1.19
1965	12.45	41.75	-0.46	0.71	1.02	3.93	1.92
1966	-10.06	-7.01	0.20	3.65	4.69	4.76	3.35
1967	23.98	83.57	-4.95	-9.18	1.01	4.21	3.04
1968	11.06	35.97	2.57	-0.26	4.54	5.21	4.72
1969	-8.50	-25.05	-8.09	-5.07	-0.74	6.58	6.11
1970	4.01	-17.43	18.37	12.11	16.86	6.52	5.49
1971	14.31	16.50	11.01	13.23	8.72	4.39	3.36
1972	18.98	4.43	7.26	5.69	5.16	3.84	3.41
1973	-14.66	-30.90	1.14	-1.11	4.61	6.93	8.80
1974	-26.47	-19.95	-3.06	4.35	5.69	8.00	12.20
1975	37.20	52.82	14.64	9.20	7.83	5.80	7.01
1976	23.84	57.38	18.65	16.75	12.87	5.08	4.81
1977	-7.18	25.38	1.71	-0.69	1.41	5.12	6.77
1978	6.56	23.46	-0.07	-1.18	3.49	7.18	9.03
1979	18.44	43.46	-4.18	-1.23	4.09	10.38	13.31
1980	32.42	39.88	-2.62	-3.95	3.91	11.24	12.40
1981	-4.91	13.88	-0.96	1.86	9.45	14.71	8.94
1982	21.41	28.01	43.79	40.36	29.10	10.54	3.87
1983	22.51	39.67	4.70	0.65	7.41	8.80	3.80
1984	6.27	-6.67	16.39	15.48	14.02	9.85	3.95
1985	32.16	24.66	30.09	30.97	20.33	7.72	3.77
1986	18.47	6.85	19.85	24.53	15.14	6.16	1.13
1987	5.23	-9.30	-0.27	-2.71	2.90	5.47	4.41
1988	16.81	22.87	10.70	9.67	6.10	6.35	4.42
1989	31.49	10.18	16.23	18.11	13.29	8.37	4.65
1990	-3.17	-21.56	6.78	6.18	9.73	7.81	6.11
1991	30.55	44.63	19.89	19.30	15.46	5.60	3.06
1992	7.67	23.35	9.39	8.05	7.19	3.51	2.90
1993	9.99	20.98	13.19	18.24	11.24	2.90	2.75
1994	1.31	3.11	-5.76	-7.77	-5.14	3.90	2.67
1995	37.43	34.46	27.20	31.67	16.80	5.60	2.54
1996	23.07	17.62	1.40	-0.93	2.10	5.21	3.32
1997	33.36	22.78	12.95	15.85	8.38	5.26	1.70
1998	28.58	-7.31	10.76	13.06	10.21	4.86	1.61
1999	21.04	29.79	-7.45	-8.96	-1.77	4.68	2.68
2000	-9.11	-3.59	12.87	21.48	12.59	5.89	3.39
2001	-11.88	22.77	10.65	3.70	7.62	3.83	1.55
2002	-22.10	-13.28	16.33	17.84	12.93	1.65	2.38
2003	28.70	60.70	5.27	1.45	2.40	1.02	1.88
2004	10.87	18.39	8.72	8.51	2.25	1.20	3.26
2005	4.91	5.69	5.87	7.81	1.36	2.98	3.42
2006	15.80	16.17	3.24	1.19	3.14	4.80	2.54
2007	5.49	-5.22	2.60	9.88	10.05	4.66	4.08
2008	-37.00	-36.72	8.78	25.87	13.11	1.60	0.09
2009	26.46	28.09	3.02	-14.90	-2.40	0.10	2.72
2010	15.06	31.36	12.44	10.14	7.12	0.12	1.50
2011	2.11	-3.26	17.95	28.23	9.46	0.04	2.96
2012	16.00	18.24	10.68	3.31	2.07	0.06	1.74
2013	32.39	45.07	-7.07	-11.36	-1.07	0.02	1.50

GABRIEL, ROEDER, SMITH & COMPANY from SBBI Yearbook \* Calculated using December to December CPI-U (1982-84=100, when available), not seasonally adjusted.

September 12, 2014

Mr. Gary W. Findlay  
Executive Director  
Missouri State Employees'  
Retirement System  
907 Wildwood  
P.O. Box 209  
Jefferson City, Missouri 65109

**Re: MOSERS – Valuation Report**

Dear Gary:

Enclosed are 20 copies of the June 30, 2014 actuarial valuation report of the Missouri State Employees' Retirement System.

Sincerely,



Brad Lee Armstrong

BLA:bd  
Enclosures

cc: Amanda Gaither  
Williams-Keepers, LLC (+1 report copy)